Appendix H

EPA Investigation

START

Superfund Technical Assessment and Response Team - Region VIII

United States
Environmental Protection Agency

Contract No. 68-W5-0031

ANALYTICAL RESULTS REPORT FOR EXPANDED SITE INSPECTION

DURANGO LEAD SMELTER
Durango, Colorado

TDD No. 9705-0010

APRIL 13, 1998

URS
OPERATING SERVICES, INC.

ANALYTICAL RESULTS REPORT
for
EXPANDED SITE INSPECTION

Durango Lead Smelter
Durango, Colorado

CERCLIS ID # CO0001399633

EPA Contract No. 68-W5-0031
TDD No. 9705-0010

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ANALYTICAL RESULTS REPORT
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EXPANDED SITE INSPECTION

Durango Lead Smelter
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1.0 INTRODUCTION

URS Operating Services, Inc. (UOS) has been tasked by the U.S. Environmental Protection Agency (EPA), Region VIII, to conduct an Expanded Site Inspection (ESI) at the Durango Lead Smelter (DLS) site (CERCLIS ID #CO0001399633) in Durango, La Plata County, Colorado. Field work for this ESI was conducted the week of October 20, 1997.

This Analytical Results Report (ARR) has been prepared in accordance with Technical Direction Document (TDD) 9705-0010, the "Guidance for Performing Site Inspections Under CERCLA," Interim Final September 1992, and the "Region VIII Supplement to Guidance for Performing Site Inspections Under CERCLA" (U.S. Environmental Protection Agency (EPA) 1992; EPA 1993). Field work included sampling and non-sampling data collection. Samples of surface water and sediment were collected from the Animas River and Lightner Creek. Fish tissue samples were collected from the Animas River. Environmental sampling procedures followed those outlined in the UOS Technical Standard Operating Procedures (TSOPs) for field operations at hazardous waste sites and "Guidelines For Studies of Contaminants in Biological Tissues for the National Water Quality Assessment Program" (URS Operating Services Inc. (UOS) 1995; U.S. Geological Survey (USGS) 1994). Non-sampling activities included site observations, photo documentation, and identification and delineation of wetlands along the Animas River.

Site characterization samples included ten surface water samples, ten collocated sediment samples, twelve brown trout fillet samples, twelve rainbow trout fillet samples, and seven Quality Assurance/Quality Control (QA/QC) samples (in addition to the laboratory matrix spike/matrix spike duplicates (MS/MSD). The quality assurance samples followed the requirements of the "Region VIII Supplement to Guidance for Performing Site Inspections under CERCLA" and included one duplicate surface water sample, one rinsate sample from sediment sampling equipment, one rinsate sample from fish tissue sample preparation equipment, and four fish tissue duplicate samples. The fish tissue duplicate samples were collected by separating out the left and right fillets from the largest fish of each species (brown trout and rainbow trout) collected at each location (upgradient of the site and downgradient of the site). The above mentioned QA/QC samples are collected at a minimum frequency of one per twenty environmental samples for the same matrix (EPA 1993). One surface water sample and one sediment sample were collected in triple volume for the laboratory MS/MSD and are not considered additional samples. In addition, two fish samples, one from each of the trout species

(brown and rainbow trout), was individually designated as MS/MSDs for the fish tissue matrix. All aqueous and sediment samples were analyzed through the EPA Contract Laboratories Program (CLP), Routine Analytical Services (RAS) for total metals at Sentinel, Inc. of Huntsville, Alabama. Additionally, surface water samples were analyzed through the EPA CLP Unique Laboratory Sample Analyses (ULSA) for total organic carbon (TOC) at Acculabs Research of Golden, Colorado. Hardness has been calculated on an as needed basis from total metals analyses. All fish tissue samples were analyzed through the EPA CLP ULSA for total metals at Quanterra Labs of Arvada, Colorado.

2.0 OBJECTIVES

The purpose of this ESI is to screen for risk to human health and the environment by gathering information with regard to EPA's Hazard Ranking System (HRS) criteria. The specific objectives of this ESI are:

- Collect fish fillet samples from the Animas River to determine if site contaminants have bioaccumulated in fish tissue, thus posing a potential threat to individuals ingesting fish from the Animas River; and

- Collect surface water and sediment samples from the Animas River at intervals of approximately 500 feet to test for the extent of contamination in water and sediments.

- Identify and delineate all wetlands present within the surface water and sediment sampling reach.

3.0 BACKGROUND INFORMATION

3.1 SITE LOCATION AND DESCRIPTION

The DLS site is located in the southeast quarter of Section 30, T. 35 N., R. 9 W., of the Durango West Quadrangle, La Plata County, Colorado. The site is located southwest of Durango, along the west bank of the Animas River (Figures 1 and 2). The approximate site coordinates are 37° 16' 03.00" N. latitude and 107° 53' 00.00" W. longitude (USGS 1963b).

3.2 SITE HISTORY AND PREVIOUS WORK

The history of smelting operations at the site extends from 1882 through approximately 1935. The San Juan Smelting and Mining Company, originally at Silverton, Colorado, began operation in Durango in 1882. In 1887, it was reported to have smelted over $1 million worth of silver, lead, gold, and copper, and was the largest smelter in the San Juan Mountains. At the turn of the century, all the major smelting corporations in Durango merged to become the American Smelting and Refining Company at this location. The American Smelting and Refining Company closed in the mid 1930s, and was dismantled in approximately 1942 (Smith 1980).

The United States Vanadium Corporation built a uranium processing mill at the site of the former lead smelter operation in 1942. The uranium mill operation and the associated tailings at this location were the focus of a U.S. Department of Energy (DOE) Uranium Mill Tailings Remedial Action (UMTRA) that was conducted to clean up the uranium mill tailings deposited along the Animas River. During the removal of those tailings (from 1986 to 1991), the DOE also removed the remaining lead smelter stack, building materials, and rubble associated with the former lead smelter. The slag, a by-product of the lead smelter operation, was left at the site because it was not within the scope of responsibility of the DOE under the UMTRA project. The slag was graded and the site area was covered with clean backfill and topsoil and vegetated. The west bank of the Animas River was riprapped to minimize erosion (U.S. Department of Energy (DOE) 1995). The UMTRA activity and associated remediation, while not the subject of this ESI, have played a major role in the redistribution of lead slag wastes at this site.

3.3 SITE CHARACTERISTICS

3.3.1 Physical Geography

The DLS site is located along the west bank of the Animas River (Figure 1). The site is located approximately 6,520 feet above mean sea level in La Plata County (USGS 1963a). The DLS site is approximately 15 acres in size, or 653,400 square feet (DOE 1995; UOS 1996). Site topography is generally flat, with a slight southeast slope allowing drainage

toward the Animas River. The slag was graded during the UMTRA project before backfill was brought in (Colorado Department of Public Health and the Environment (CDPHE) 1996; UOS 1996). The site is situated in a transitional area between the Southern Rocky Mountain Physiographic Province and the Colorado Plateau Province (Bureau of Reclamation (BOR) 1981).

3.3.2 Geology

The site area is underlain by the dark gray to black marine Mancos Shale, which is more than 1,700 feet thick. The Mancos Shale is truncated by the Smelter Mountain fault south of the site area. The Point Lookout Sandstone and Menefee Formations outcrop south of the site area and south of the Smelter Mountain fault. At the site area along the base of Smelter Mountain, the Mancos Shale is directly overlain by a layer of colluvium up to 25 feet thick. The colluvium consists of poorly sorted, silty soil derived from Smelter Mountain. Along Lightner Creek and the Animas River, alluvial deposits of sand and gravel up to 15 feet thick occur over the shale bedrock and the colluvium (DOE 1995).

3.3.3 Hydrogeology

Hydrostratigraphic units at the DLS site include the consolidated bedrock unit overlain by unconsolidated surficial deposits. Together the surficial hydrostratigraphic units (alluvium and colluvium) and the bedrock unit (the uppermost few feet of weathered, fractured Mancos Shale) directly under the surficial deposits comprise the uppermost aquifer in the site area. Groundwater occurs in a shallow alluvial aquifer overlying bedrock at the former lead smelter site. Groundwater at the site moves predominantly through the alluvium overlying the low-permeability Mancos Shale bedrock and discharges into the Animas River to the east (DOE 1995).

In gravels above the bedrock, the hydraulic conductivity is estimated to be 7×10^{-3} centimeters per second (cm/sec). In the colluvium near the base of Smelter Mountain, recharge is primarily by runoff from the mountain and by infiltrating precipitation. Sand

and gravel deposits receive recharge from Lightner Creek and the Animas River (DOE 1995).

3.3.4 Hydrology

Site topography indicates that surface water drainage via overland flow is directed to the south and east toward the Animas River (USGS 1963b; UOS 1996). The annual mean discharge rate of the Animas River approximately one mile upstream of the site is 823 cubic feet per second (cfs) (USGS 1996). Upstream of the site area, the Animas River has a drainage area of approximately 770 square miles (DOE 1995). The site lies within the Animas River 100-year flood plain (BOR 1981).

3.3.5 Meteorology

The DLS site is located in a semiarid climate zone. The mean annual precipitation as totaled from the University of Delaware (UD) database is 12.83 inches. The net annual precipitation as calculated from precipitation and evapotranspiration data obtained from the UD database is 1.61 inches (University of Delaware, Center for Climate Research, Department of Geography 1986). The 2-year, 24-hour rainfall event for this area is 1.5 inches (Dunne, Thomas and Luna B. Leopold 1978).

4.0 ANALYTICAL DATA

4.1 DATA VALIDATION AND INTERPRETATION

The sample data collected during this focused SI were reviewed using the HRS guidelines for analytical interpretation (Office of Federal Register 1990). As reported in the analytical results in Tables 2 and 3, concentrations of contaminants in surface water and sediment samples, as noted by a star (★), are determined to be significantly above background based on the following:

- If the **upgradient** analyte concentration is greater than its Sample Quantitation Limit (SQL), and if the **release sample** analyte concentration is greater than its SQL, three times greater than the upgradient, and five times greater than the blank concentration.

- If the **upgradient** analyte concentration is not greater than its SQL and if the **release sample** analyte concentration is greater than its SQL, greater than the upgradient SQL, and five times greater than the blank analyte concentration.

All data analyzed by the CLP ULSA laboratories were validated by TechLaw, Inc. All data are acceptable for use as qualified in the data validation report. The complete data validation report, laboratory forms, and SQL calculations are located in Appendix C.

Results can also be qualified as estimated based upon two criteria. The first of the criteria is noted by a **J** qualifier and indicates that the associated numerical value is an estimated quantity because quality control criteria were not met. The presence of the analyte is considered reliable. The second of the criteria is noted by brackets [ ] and indicates that the associated numerical value was detected below the Contract Required Detection Limit (CRDL), but was detected at a level greater than the method detection limit and therefore is required by the CLP contract to be qualified as an estimate by the laboratory. Analytes that were non-detect are noted by a **U** qualifier following the detection limit for that analyte.

All surface water and sediment data were validated by TechLaw, Lakewood, Colorado. Data qualified with an **R** (all aqueous samples for antimony, arsenic, and selenium) indicate that the analyte specific for that sample was rejected. Aqueous sample data for antimony, arsenic, and selenium were rejected due to the matrix spike being out of the acceptable range of detection. Resampling is necessary to confirm the presence of the antimony, arsenic, and selenium.

As reported in the analytical results for fish tissue samples in Tables 4 through 7, elevated concentrations of contaminants, as noted by a star (★), are determined by sample concentrations based on the following:

- If the sample concentrations are greater than the benchmarks for the surface water pathway human food chain. These benchmarks include the U.S. Food and Drug Administration Action Level (FDAAL), Reference Dose Screening Concentrations, or Cancer Risk Screening Concentrations (EPA 1995).

Fish tissue results were statistically analyzed to determine if the downstream fish population contained significantly higher concentrations of analytes than the background fish population. A comparison between the means of the two populations was performed using a t-test for populations with different standard deviations. The t-statistic and degrees of freedom were compared to the student-t distribution value Table for a 95% significance level. The test was used to prove or disprove the hypothesis that the downstream fish population has metal concentrations equal to or greater than the upstream fish population. All fish tissue data were validated by TechLaw, Lakewood, Colorado. All data are acceptable for use as qualified in the data validation report. The complete data validation report and laboratory forms are located in Appendix C.

5.0 WASTE CHARACTERIZATION

The buried slag that remains along the west bank of the Animas River is approximately 25 feet thick and covers approximately 15 acres (DOE 1995; UOS 1996). The volume of slag has been estimated at approximately 200,000 cubic yards of material. As a part of the DOE UMTRA, the slag was graded and covered by a minimum of approximately 18 to 24 inches of clean backfill and approximately 6 inches of topsoil. The area was vegetated with indigenous plant species (DOE 1995). Building material, rubble and bricks, and the smelter stack were removed as a part of the UMTRA by the DOE to the Bodo Canyon disposal site, approximately 1.5 miles to the southwest of the site in a mountain valley near Bodo Canyon. During the UMTRA removal, the DOE sampled the bricks from the old smelter stack. The DOE indicated the presence of Radium-226 concentrations in the brick material. However, during the UOS site reconnaissance, foundation material, rusted metal beams, and old bricks were noted along the west bank of the Animas River where slag outcrops were identified (UOS 1996). The former raffinate ponds indicated on Figure 2 were associated with the DOE UMTRA project and were approximately 3,000 feet downstream of the DLS site at the approximate location of DLX-SW/SE-7. Raffinate, the waste solution produced from

the uranium-vanadium recovery process, was stored in evaporation ponds. Contaminated soils from these ponds were removed and relocated by the DOE during the remedial action (DOE 1995).

A total of eleven slag samples were collected by MK-Ferguson Company in 1989 and exhibited the following elements as the highest concentrations of all eleven samples: antimony (70 ppm); arsenic (480 ppm); barium (8,100 ppm); cobalt (160 ppm); copper (5,400 ppm); lead (25,000 ppm); mercury (0.5 ppm); molybdenum (150 ppm); uranium (233 ppm); vanadium (910 ppm) (DOE 1995).

6.0 SURFACE WATER AND SEDIMENT PATHWAY

6.1 SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

Collocated surface water and sediment samples were collected at nine locations along the Animas River and at one location on Lightner Creek (Figure 2). All surface water and sediment samples collected downstream of the site PPE were collected at approximate 0.10 mile or 500 foot spacings from the previous sample location. The sample locations and rationale are presented in Table 1.

The background sample on the Animas River (DLX-SW/SE-01) was collected from the west bank of the river approximately 0.25 mile upstream of site influences. The MS/MSD was collected at the background location. The background sample on Lightner Creek (DLX-LC-SW/SE-01) was collected from approximately 0.60 mile upstream of the confluence of Lightner Creek and the Animas River adjacent to the Best Western Motel parking lot. The sample collected from the site probable point of entry (PPE) into the Animas River (DLX-SW/SE-02) was collected from a point immediately below the Smelter Rapids. Sample DLX-SW/SE-03 was collected from the west bank of the Animas River approximately 55 yards downstream of the Smelter Rapids. Sample DLX-SW/SE-04 was collected from the west bank of the Animas River immediately across the stream from the Main Wastewater Treatment Plant Building. Sample DLX-SW/SE-05 was collected from the west bank of the Animas River just upstream and across the river from the Park Visitors Center. Sample DLX-SW/SE-06 was collected from the west bank of the Animas River approximately 30 yards upstream of the City Park boat launch. Sample DLX-SW/SE--07 was collected from the west bank of the Animas River from a location that is approximately 15 yards downstream of the City

Park boat launch. Sample DLX-SW/SE-08 was collected from the west bank of the Animas River from a location that is approximately 170 yards downstream of sample station DLX-SW/SE-07. The most downstream sample location was DLX-SW/SE-09, which is located on the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge. Each of the surface water-sediment sample locations downgradient of the site PPE was spaced approximately 500 feet from the adjacent sample location.

6.2 SURFACE WATER AND SEDIMENT ANALYTICAL RESULTS

The surface water and sediment sample analytical results are reported in Tables 2 and 3. Laboratory data and validation comments may be found in Appendix C, under separate cover.

Aluminum was detected at concentrations significantly above background in surface water samples DLX-SW-02, DLX-SW-03, DLX-SW-05, DLX-SW-07, DLX-SW-08, DLX-SW-09, and DLX-SW-10. Mercury was detected at a concentration significantly above background in sediment sample DLX-SE-04, and silver was detected at a concentration significantly above background in sediment samples DLX-SE-06 and DLX-SE-07.

6.3 FISH TISSUE SAMPLE LOCATIONS

Fish tissue samples were collected from both brown and rainbow trout at upgradient and downgradient segments along the Animas River (Table 1 and Figure 1). It should be noted that these fish tissue samples that were collected constitute a grab sample of the existing fish population and may not account for migration of fish within the Animas River.

All fish collected for this ESI were collected under State of Colorado Division of Wildlife scientific collection license #97-0752. The fish were collected by employing an electro-shock method from a 16-foot self-bailing raft. The raft was owned and operated the U.S. Bureau of Reclamation Durango field office crew. The fish collection areas were changed from the approved sample plan locations because of the access requirements for the Bureau of Reclamation crew's boat. Fish tissue samples DLX-BR-1A through DLX-BR-1F and DLX-RB-1A through DLX-RB-1F were collected

from the upgradient (background) fish sampling reach, located between 7 and 9 miles upstream of the site. Fish tissue samples DLX-BR-2A through DLX-BR-2F and DLX-RB-2A through DLX-R-2F were collected from the downgradient (potentially affected) fish sampling reach, located between 3.5 and 5.0 miles downstream of the site.

6.4 FISH TISSUE ANALYTICAL RESULTS

All fish tissue samples were compared on a statistical basis as a grab fish population upgradient to a grab fish population downgradient of the site. It is important to note that while these fish tissue samples were collected from sampling reaches upgradient and downgradient, respectively, of the site, it is the nature of fish to migrate; hence, it can not be confirmed that these fish have lived their entire lives either upgradient or downgradient of the site.

Duplicate fish tissue sample results were comparative with little differences in inorganic concentrations between the left and right fillets (Tables 4 through 7).

A statistical analysis was conducted on the inorganic fish tissue data to determine the range of concentrations for each analyte in upstream and downstream tissue samples based upon a 95% confidence level. The range of concentrations for upstream and downstream tissue samples were then compared to identify significant differences between upstream and downstream fish tissue. Tables 8 and 9 show the concentration ranges for upstream and downstream rainbow trout and brown trout, along with the applicable benchmarks for comparison. There were no elements detected in fish tissue samples found to be statistically significantly elevated.

6.5 ATTRIBUTION AND SURFACE WATER AND SEDIMENT PATHWAY TARGETS

The concentration of mercury (DLX-SE-04), while meeting criteria as significantly above background, is potentially attributable to a more widespread problem arising from elevated mercury concentrations in the southern Colorado mountains from area power plants (EPA 1991). Detections of aluminum in surface water samples are likely not attributable to the DLS site since aluminum was not detected as a source contaminant.

Municipal drinking water for the city of Durango is supplied from surface water that is collected from the Florida and Animas Rivers and then is mixed and supplied to the entire population of Durango. The main surface water intake for the municipal supply is located along the Florida River, a separate watershed from the Animas River that flows to the south approximately five miles to the east of the site (Figure 1). The municipal surface water intake on the Animas River, at 29th Street in Durango, is located approximately two miles upstream of the site (Figure 1). Water from the Animas River is used primarily when there is a high demand on the municipal water supply, generally during the summer months (Durango Public Works 1996).

The DLS site is located on the west banks of the Animas River. Contaminants from the buried slag could potentially migrate to the surface water pathway where slag is exposed at the river bank and where slag is exposed in drainages leading to the Animas River (UOS 1996).

The Animas River is a recreational fishery (Colorado Division of Wildlife (CDOW) 1996). The Colorado Department of Wildlife stocks the Animas River with brown trout, rainbow trout, and cutthroat trout. Native species in the Animas River include the blue head sucker (that is most abundant), flannel mouth sucker, mottled sculpin, and speckled dace. Occasionally the non-native white sucker is identified in the Animas. The stretch of the Animas from Lightner Creek (one mile north of the site area) to Purple Cliffs (approximately two and one-half miles downstream of the DLS site) was used by approximately 6,200 anglers from April 1990 through August 1990. The fishing limit is two fish, 16 inches or longer (artificial flies and lures only). The catch rate on this stretch of the Animas is 0.75 fish per hour or 1.2 fish per angler per trip, or approximately 3,000 pounds per year (based on an estimate of 0.4 pounds per fish greater than or equal to a 16-inch fish) (CDOW 1996).

The Animas River, a recreational water body, is used as a kayak course adjacent to the site area (UOS 1996). There are no private drinking water intakes identified along the Animas River downstream of the site (Durango Public Works 1996). There are no U.S. Department of the Interior National Wetland Inventory (NWI) maps available for the Durango area; however, emergent riverine wetland growth was identified during the site reconnaissance along the 15-mile downstream target distance limit. Approximately 2,094 feet or 0.40 miles of riparian emergent and scrub shrub wetland

frontage were observed along the Animas River. This wetland extends from an area immediately downgradient of the approximate location of sample location DLX-SW/SE-3 to an area immediately upgradient of the Santa Rita Bridge. The next closest downgradient wetland frontage grouping was located approximately one mile downstream of the DLS site at the Santa Rita Bridge and totaled approximately 1,820 feet of frontage distance (URS Greiner 1997).

7.0 ADDITIONAL PATHWAYS

7.1 GROUNDWATER PATHWAY

The DOE has documented 20 wells within a two-mile radius of the site, that serve approximately 47 people based on 2.35 persons per household in Durango (DOE 1995; U.S. Department of Commerce, Bureau of the Census (USDOC) 1990). The Colorado State Engineers Office has records of 90 household-use-only well permits (that serve approximately 211 people) completed to the alluvium and bedrock within two to four miles of the site (Colorado State Engineer's Office 1996; USDOC 1990). While records for these wells exist, UOS attempted to sample the closest of these wells in 1996 for the Durango Lead Smelter Screening Site Inspection, only to discover that these residences are all now supplied by municipal water from the Florida and Animas Rivers (Durango Public Works 1996; UOS 1996). Development and utility policies for the city of Durango currently prohibit the drilling of private wells within the city limits (Durango Public Works 1996).

7.2 AIR AND SOIL EXPOSURE PATHWAYS

Waste slag from the former smelter operation was buried on site during the DOE UMTRA project. Slag outcroppings were observed during the UOS site reconnaissance, but had minimal surface exposure for air pathway consideration (UOS 1996). If contaminants migrated through the air pathway, proximal targets include the total population,(12,430 people) of the city of Durango, which is situated within four miles of the site (USDOC) 1990). The nearest residences (approximately five houses) are located on the east bank of the Animas River, approximately one-quarter of a mile to the east of the site. The site area was backfilled with a minimum of 18 to 24 inches of clean backfill and

another 6 inches of topsoil, and vegetated by the DOE during the UMTRA (CDPHE 1996). The prevailing wind direction is west-northwest down the river valley (DOE 1995).

The DLS site is owned by the state of Colorado. The UMTRA was conducted by the DOE. The source area (slag) was covered with a minimum of 18 to 24 inches of backfill and another 6 inches of topsoil during the UMTRA. Slag outcroppings were identified during the UOS site reconnaissance along the west bank of the Animas River (UOS 1996). Currently, the state of Colorado plans to sell the southern portion of the site (the location of the former raffinate ponds) to the Bureau of Reclamation for the installation of a pumping station as a part of the Animas/La Plata Wastewater Management Plan (Figure 2). The northern portion of the property (the former location of the uranium mill tailings and current location of buried lead smelter slag) is slated for purchase by the city of Durango (CDPHE 1996).

Access to the site is restricted by fencing and locking gates (UOS 1996). Approximately 4,143 people reside within one mile of the site, of whom approximately 1,036 reside within the 0.25-mile radius of influence (USDOC 1990). The Site Inspection (SI) conducted by UOS in 1996 indicated elevated concentrations of copper, lead, manganese, and silver in residential soils sampled in the predominant downwind direction of the DLS site (UOS 1996).

Other potential targets include federally listed threatened or endangered species that may be potentially present in La Plata County. These species include the black-footed ferret (endangered), Knowlton's cactus (endangered), American peregrine falcon (endangered), bald eagle (threatened), Eskimo curlew (endangered), and the southwestern willow flycatcher (endangered). Critical habitat for the Mexican spotted owl (threatened) occurs in La Plata County (USFWS 1996).

8.0 SUMMARY

The DLS site is a former lead smelter and covers approximately 15 acres on the west bank of the Animas River. A Site Inspection (SI) conducted by UOS in 1996 concluded the potential for vanadium and zinc contamination was a viable threat and that further sampling was necessary. Detections from the previous SI were not reported in this ESI and releases observed in the previous SI were not confirmed or documented again in the completion of this ESI. There were no observed releases within 0.4 miles downstream of the DLS site. At 0.4 miles downstream, mercury was detected as an observed release; however, airborne mercury is a common problem in this area.

Contaminants from the buried slag could potentially migrate to the surface water pathway where slag is exposed at the river bank and where slag is exposed in drainages leading to the Animas River.

There are no private drinking water intakes identified along the Animas River downstream of the site. The Animas River is a recreational fishery and is stocked by the Colorado Division of Wildlife with brown trout, rainbow trout, and cutthroat trout. Native species in the Animas River include the blue head sucker (that is most abundant), flannel mouth sucker, mottled sculpin, and speckled dace. The catch rate on this stretch of the Animas is 0.75 fish per hour or 1.2 fish per angler per trip, or approximately 3,000 pounds per year (based on an estimate of 0.4 pounds per fish greater than or equal to a 16-inch fish).

The Animas River, a recreational water body, is used as a kayak course adjacent to the site area. There are no NWI maps available for the Durango area; however, emergent riverine wetland growth was identified during the site reconnaissance along the 15-mile downstream target distance limit. Approximately 2,094 feet or 0.40 miles of riparian emergent and scrub shrub wetland frontage were observed along the Animas River. Approximately 2,094 feet or 0.40 miles of riparian emergent and scrub shrub wetland frontage were observed along the Animas River. This wetland started immediately downgradient of the approximate location of sample location DLX-SW/SE-3 and ended immediately upgradient of the Santa Rita Bridge.

A statistical analysis was conducted on the inorganic fish tissue data to determine the range of concentrations for each analyte in upstream and downstream tissue samples based upon a 95 % confidence level. The range of concentrations for upstream and downstream tissue samples were then compared to identify significant

differences between upstream and downstream fish tissue, along with the applicable benchmarks for comparison. There were no elements detected in fish tissue samples found to be statistically significantly elevated.

9.0 LIST OF REFERENCES

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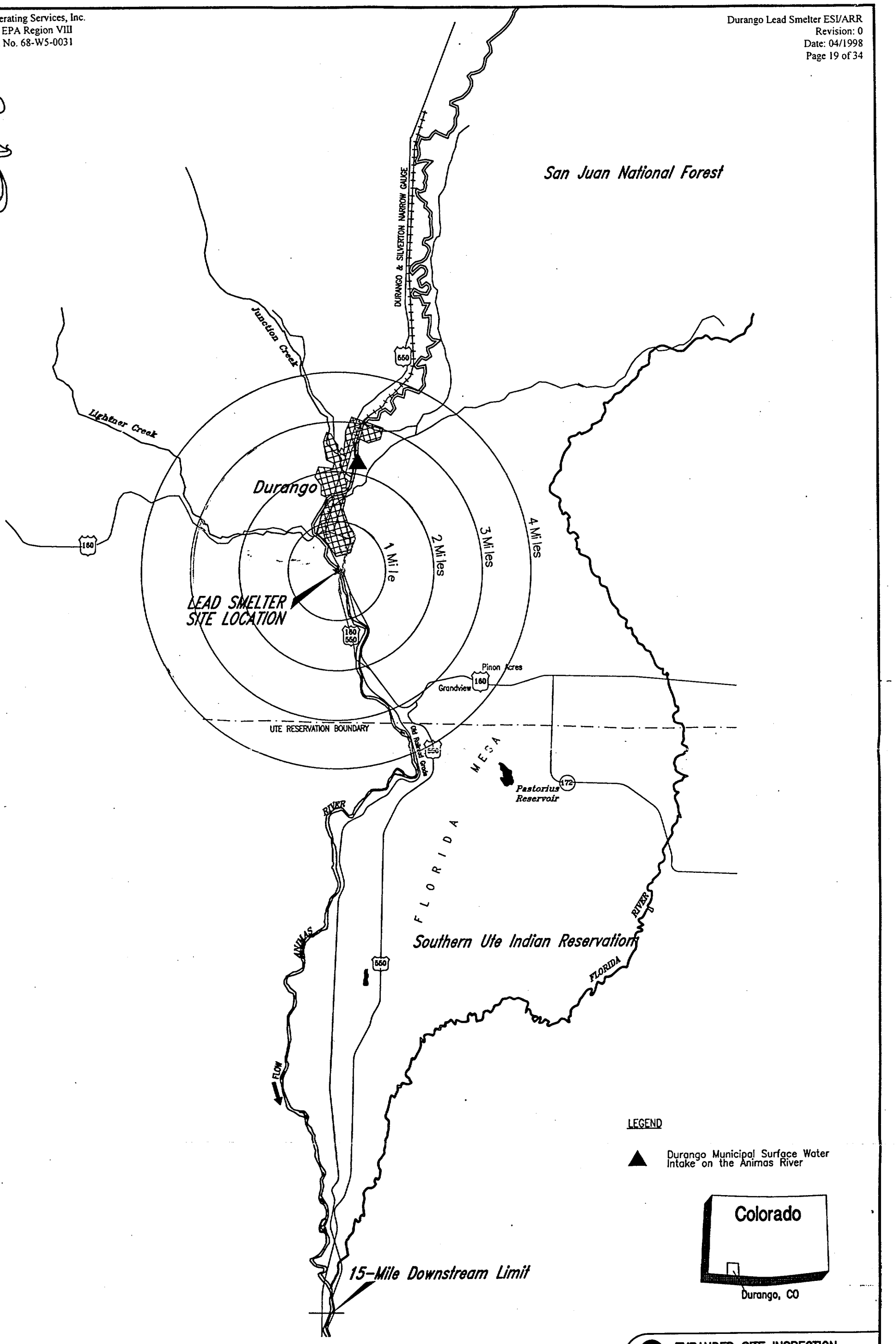

LEGEND

▲ Durango Municipal Surface Water Intake on the Animas River

10000' 2500' 0 5000' 10000' 20000'

SOURCE:
USGS 1983
UOS 1996

75-70510.00
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EXPANDED SITE INSPECTION
UOS Job No. 75-70510.00

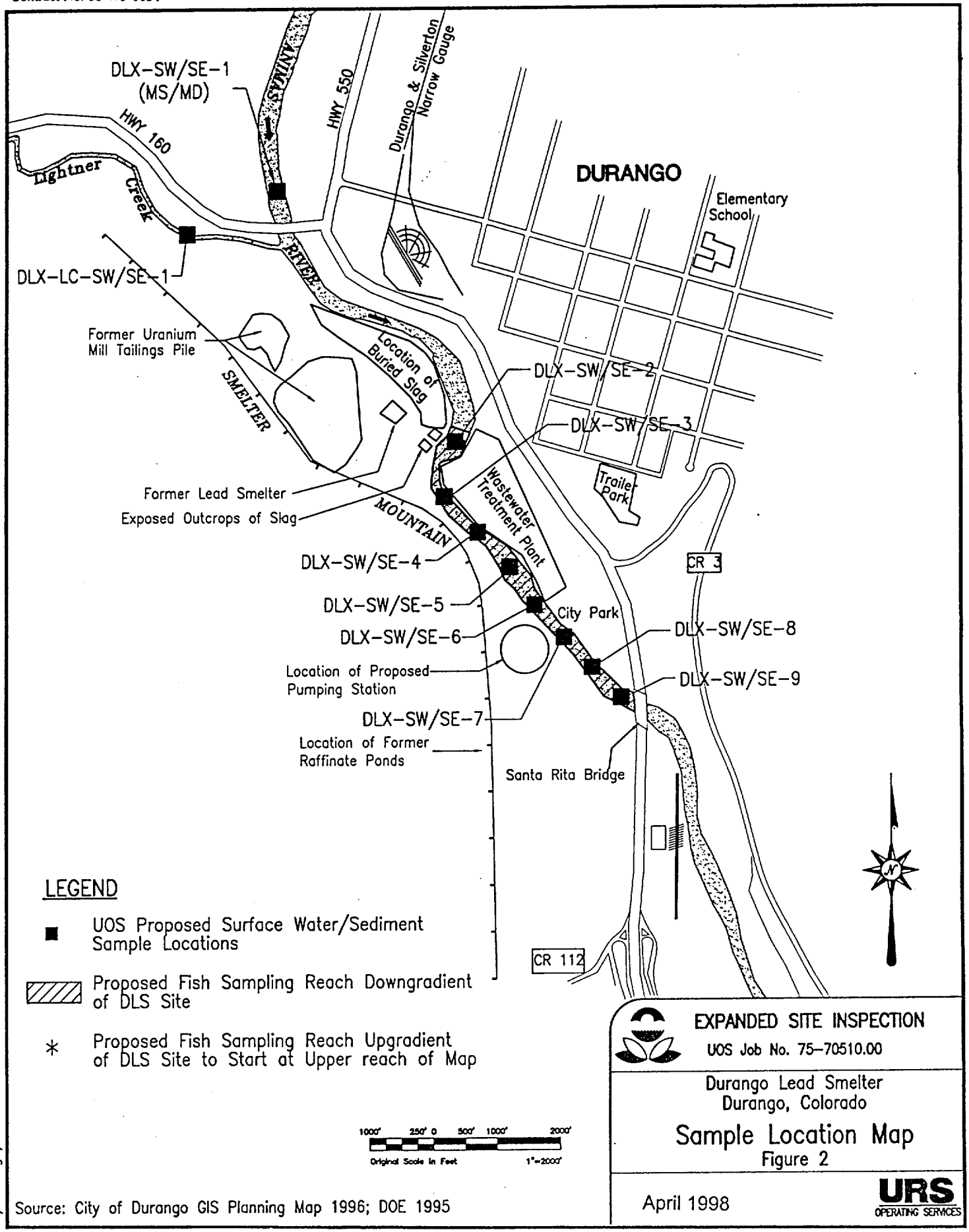
Durango Lead Smelter
Durango, Colorado

Area of Influence Map
Figure 1

April 1998

URS OPERATING SERVICES

F:/durango/60201sf1.dwg DDJ DN 08-05-97



Source: City of Durango GIS Planning Map 1996; DOE 1995

EXPANDED SITE INSPECTION
UOS Job No. 75-70510.00

Durango Lead Smelter
Durango, Colorado

Sample Location Map
Figure 2

April 1998

URS OPERATING SERVICES

F:/durango/60201SF2 DDJ DN 08-07-97

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Sediment Samples	DLX-SE-1 (MS/MSD)	Collected from the west bank of the Animas River, approximately 0.25 miles upstream of the site PPE.	Document background conditions along the Animas River. The MS/MSD collected to test the precision of lab analytical methods.
	DLX-LC-SE-1	Background sample collected from Lightner Creek, approximately 0.60 mile upstream from confluence with Animas River.	Document background conditions on Lightner Creek before it discharges into the Animas River.
	DLX-SE-2	Collected from the west bank of the Animas River at the site PPE immediately below Smelter Rapids.	Test for potential site impacts to Animas River wetlands and fishery.
	DLX-SE-3	Collected from the west bank of the Animas River approximately 55 yards downstream of Smelter Rapids.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-4	Collected from the west bank of the Animas River at the Waste Water Treatment Plant.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-5	Collected from the west bank of the Animas River at the Park Visitors Center.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-6	Collected from the west bank of the Animas River approximately 30 yards upstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-7	Collected from the west bank of the Animas River approximately 15 yards downstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-8	Collected from the west bank of the Animas River approximately 500 feet downstream of DLX-SE-07.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-9	Collected from the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge.	Test for extent of site impacts to Animas River wetlands and fishery.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Brown Trout Fish Tissue Samples	DLX-BR-1A	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1B	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1C	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1D	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1E	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1F	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-2A (MS/MSD)	Brown trout fish tissue sample collected from the Animas River between 3.5 to 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2B	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2C	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2D	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Brown Trout tissue sample (continued)	DLX-BR-2E	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2F	Brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
Rainbow Trout Fish Fillet Samples	DLX-RB-1A	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1B	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1C	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1D	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1E	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1F	Background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-2A (MS/MSD)	Rainbow trout fish tissue sample to be collect ed from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2B	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Rainbow Trout tissue sample (continued)	DLX-RB-2C	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2D	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2E	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2F	Rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
Surface Water and Sediment QA/QC Samples	DLX-SW-10	Surface water duplicate of DLX-SW-8.	Quality Assurance sample to document the ability to collect collocated samples in the field.
	DLX-SW-11	Rinsate Blank from sediment sampling equipment.	Document thoroughness of decontamination process.
Fish tissue Species QA/QC Samples	DLX-BRRB-1	Rinsate Blank from fish tissue sampling equipment.	Document thoroughness of decontamination process.
	DLX-BR-1FD Brown Trout Duplicate	Duplicate background brown trout fish tissue sample collected from the Animas River between 7.0 and 9.0 miles upstream of the DLS site. Duplicate of DLX-BR-1F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Establish background values for fish tissue on the Animas River.
	DLX-BR-2FD Brown Trout Duplicate	Duplicate brown trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE. Duplicate of DLX-BR-2F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Fish Tissue QA/QC Samples (continued)	DLX-RB-1FD Rainbow Trout Duplicate QA/QC Sample	Duplicate background rainbow trout fish tissue sample collected from the Animas River between approximately 7.0 to 9.0 miles upstream of the DLS site. Duplicate of DLX-RB-1F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Establish background values for fish tissue on the Animas River.
	DLX-RB-2FD Rainbow Trout Duplicate QA/QC Sample	Duplicate rainbow trout fish tissue sample collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE. Duplicate of DLX-RB-2F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 2
Surface Water Sample Inorganic Analytical Results
Durango Lead Smelter - Animas River and Lightner Creek
Concentrations in μg/l (ppb) - October 1997/Case Number 25768

Sample No.: Sample ID: Sample Location:	MHDL88 DLX-SW-01 Animas River Background	MHDL89 DLS-LC-SW-01 Lightner Creek Background	MHDL90 DLX-SW-02 Animas River at PPE	MHDL91 DLX-SW-03 Animas River approximately 55 yards downstream of PPE	MHDL92 DLX-SW-04 Animas River at Waste Water Treatment plant	MHDL93 DLX-SW-05 Animas River at Park Visitors Center	MHDL94 DLX-SW-06 Animas River upstream of city park boat launch	MHDL95 DLX-SW-07 Animas River downstream of city park boat launch	MHDL96 DLX-SW-08 Animas River approximately 500 feet downstream of DLX-SW-07	MHDL98 DLX-SW-10 Duplicate surface water sample collected at DLX-SW-08	MHDL97 DLX-SW-09 Animas River approximately 20 yards upstream of Sant Rita Bridge	MHDL 99 DLX-SW-11 Rinsate blank
Aluminum (Al)	[175]	[23.2] J (200)	★ 250 (200)	★ 208 (200)	[174]	★ 203 (200)	[196]	★ 214 (200)	★ 223 (200)	★ 203 (200)	★ 226 (200)	[37.3] J
Antimony (Sb)	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR	4.8 UR
Arsenic (As)	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR	4.1 UR
Barium (Ba)	[47.1]	[89.5] (200)	[49.5]	[48.2]	[47.3]	[46.6]	[48.0]	[48.0]	[48.7]	[47.4]	[48.1]	0.60 U
Beryllium (Be)	0.10 U (5)	0.10 U (5)	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Cadmium (Cd)	0.69 U	0.30 U (25)	0.58 U	0.61 U	0.69 U	0.73 U	0.63 U	0.64 U	[0.51] (25.0)	0.62 U	0.53 U	0.33 U
Calcium (Ca)	50,700 (5)	72,300 U (5)	52,200	51,000	50,300	49,200	50,700	50,300	50,000	49,000	49,600	[237]
Chromium (Cr)	0.70 U	0.70 U 10)	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U
Cobalt (Co)	1.1 U (50)	1.1 U (50)	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Copper (Cu)	[14.5] (25)	[17.2] (25)	[17.6]	[6.3]	[6.5]	54.4	[7.6]	47.9	[21.0]	[6.4] J	[21.9]	[18.9]
Iron (Fe)	333 J (100)	60.6 UJ (100)	370 J	366 J	326 J	317 J	346 J	333 J	326 J	350 J	378 J	39.1 UJ
Lead (Pb)	2.6 U (3.0)	1.8 U (3.0)	3.0 U	3.4 U	3.6 U	8.1 U	3.3 U	4.3 U	3.2 U	2.9 U	4.1 U	3.6 U
Magnesium(Mg)	7,390	25,600	7,880	7,430	7,260	7,200	7,380	7,360	7,290	7,120	7,230	[85.9]
Manganese(Mn)	103 J (15)	[13.9] J (15)	107 J	107 J	99.2 J	103 J	98.5 J	106 J	101 J	93.7 J	106 J	[5.5] J
Mercury (Hg)	0.10 U	0.10 U (0.2)	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Nickel (Ni)	[1.8] (40)	1.3 U (40)	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Potassium (K)	[2,130] J	[2,260] J	[2,220] J	[2,170] J	[2,190] J	[2,130] J	[2,290] J	[2,250] J	[2,320] J	[2,270] J	[2,290] J	[140] J
Selenium (Si)	3.0 UR	2.3 UR	2.3 UR	2.3 UR	[2.8]R	2.3 UR	2.3 UR	2.3 UR	[2.6] R	2.3 UR	2.3 UR	2.3 UR
Silver (Ag)	0.80 U	0.80 U (10)	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U
Sodium (Na)	8,890	16,900	9,380	9,130	9,110	9,040	9,410	9,370	9,580	9,450	9,580	[701]
Thallium (Tl)	2.9 U (50)	2.9 U (50.0)	2.9 U	[3.4] (50.0)	2.9 U	2.9 U	[3.4] (50.0)	2.9 U	[3.7] (50.0)	2.9 U	2.9 U	2.9 U
Vanadium (V)	1.4 U (50)	1.4 U (50)	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Zinc (Zn)	101 J (20)	[9.4] J (20)	120 J	101 J	97.4 J	109 J	99.0 J	110 J	97.6 J	90.6 J	96.4 J	[10.2] J

J - The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U - The analyte was not detected above the CRDL
R - Data rejected
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)
( ) - Sample Quantitation Limit
★ - An elevation concentration as defined in section 4.1.

TABLE 3
Sediment Sample Inorganic Analytical Results
Durango Lead Smelter - Animas River and Lightner Creek
Concentrations in mg/kg (ppm) - October 1997/Case Number 25768

Sample No.: Sample ID: Sample Location:		MHDJ20 DLX-SE-01 Animas River Background	MHDJ21 DLS-LC-SE-01 Lightner Creek Background	MHDJ22 DLX-SE-02 Animas River at PPE	MHDJ23 DLX-SE-03 Animas River approximately 55 yards downstream of PPE	MHDJ24 DLX-SE-04 Animas River at Waste Water Treatment plant	MHDJ25 DLX-SE-05 Animas River at Park Visitors Center	MHDJ26 DLX-SE-06 Animas River upstream of city park boat launch	MHDJ27 DLX-SE-07 Animas River downstream of city park boat launch	MHDW23 DLX-SE-08 Animas River approximately 500 feet downstream of DLX-SW-07	MHDW24 DLX-SE-09 Animas River approximately 20 yards upstream of Sant Rita Bridge
Aluminum	(Al)	5,120 J (3.1)	4,900 J (2.9)	3,960 J	4,650 J	5,270 J	4,900 J	5,660 J	5,030 J	6,270 J	6,190 J
Antimony	(Sb)	1.3 UJ (1.3)	1.2 UJ (1.2)	1.2 UJ	1.1 UJ	1.3 UJ	1.3 UJ	1.7 UJ	4.5 UJ	1.3 UJ	1.2 UJ
Arsenic	(As)	7.6 J (1.1)	4.8 J (1.0)	9.5 J	7.6 J	6.9 J	[1.9] J	6.5 J	3.8 J	10.2 J	2.6 J
Barium	(Ba)	133 (0.16)	180 (0.15)	111	111	124	177	118	122	159	146
Beryllium	(Be)	[0.44] (0.03)	[0.51] (0.03)	[0.40]	[0.44]	[0.47]	[0.47]	[0.46]	[0.48]	[0.54]	[0.56]
Cadmium	(Cd)	2.5 (0.08)	[0.75] (0.08)	2.2	2.1	2.1	1.8	1.7	2.1	2.5	2.5
Calcium	(Ca)	34,200 (1.3)	39,800 (1.2)	17,300	20,000	23,300	27,900	9,630	20,800	20,300	20,200
Chromium	(Cr)	5.2 (0.19)	6.4 (0.18)	4.7	4.5	5.2	5.2	5.3	4.8	5.9	6.2
Cobalt	(Co)	[6.7] (0.30)	[5.7] (0.28)	[6.2]	[7.6]	[7.3]	[7.4]	[7.8]	[7.3]	[8.2]	[8.2]
Copper	(Cu)	66.0 J (0.3)	23.7 J (0.28)	34.7 J	51.0 J	52.2 J	72.8 J	50.2 J	76.5 J	82.2 J	81.4 J
Iron	(Fe)	14,500 (3.2)	16,200 (3.0)	14,900	13,800	16,200	14,700	14,900	15,400	17,100	16,900
Lead	(Pb)	175 (0.49)	17.0 (0.46)	89.7	144	132	145	142	187	231	214
Magnesium	(Mg)	3,750 (2.0)	8,690 (1.9)	5,630	4,660	5,440	4,960	3,340	4,190	4,530	4,960
Manganese	(Mn)	1,120 (0.11)	168 (0.10)	1,070	1,350	993	1,220	1,190	1,450	1,460	1,230
Mercury	(Hg)	[0.07] (0.07)	0.06 U (0.06)	[0.09]	0.06 U	★ 0.37 (0.07)	0.07 U	0.06 U	0.07 U	0.07 U	0.06 U
Nickel	(Ni)	11.0 (0.35)	17.2 (0.30)	10.2	10.6	11.9	11.9	[8.5]	[9.4]	[9.9]	11.0
Potassium	(K)	[1,100] (3.9)	1,690 (3.6)	[981]	[1,090]	[1,220]	[1,240]	[1,100]	[1,100]	[1,240]	1,300
Selenium	(Si)	0.63 U (0.63)	[0.81] (0.58)	0.57 U	0.55 U	0.61 U	0.65 U	0.60 U	0.65 U	0.63 U	0.57 U
Silver	(Ag)	[1.7] (0.22)	[0.83] J (0.20)	[0.97] J	[1.3]	4.2	[1.8]	★ 6.3 (0.21)	★ 5.5 (0.23)	[2.1]	4.8
Sodium	(Na)	[189] (25.4)	[210] (23.6)	[293]	[162]	[152]	[283]	[143]	[210]	[202]	[435]
Thallium	(Tl)	0.79 U (0.79)	0.74 U (0.74)	0.72 U	0.69 U	0.77 U	0.81 U	0.75 U	0.82 U	0.79 U	0.72 U
Vanadium	(V)	19.2 (0.38)	17.1 (0.36)	21.0	14.3	19.2	16.4	15.0	16.0	17.0	17.4
Zinc	(Zn)	502 (0.22)	118 (0.20)	494	484	396	425	417	530	607	649

J - The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U - The analyte was not detected above the CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)
( ) - Sample Quantitation Limit
★ - An elevation concentration as defined in section 4.1.

TABLE 4
Upstream Fish Tissue Analytical Results-Brown Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

Sample No.: Species/Sex: Standard Length: Total Length: Total Weight: Fillet Weight:		Reference Upstream Brown Trout Tissue Value Range (95% Confidence Interval)	DLX-BR-1A Brown Trout/male 34.5 cm 38.0 cm 1 lb 4.75 oz 6.15 oz	DLX-BR-1B Brown Trout/male 32.0 cm 36.0 cm 1 lb 0.15 oz 3.85 oz	DLX-BR-1C Brown Trout/male 31.0 cm 35.0 cm 13.4 oz 3.25 oz	DLX-BR-1D Brown Trout/male 38.5 cm 42.0 cm 1 lb 11.0 oz 6.70 oz	DLX-BR-1E Brown Trout/female 36.0 cm 40.0 cm 1 lb 5.8 oz 4.55 oz	DLX-BR-1F Brown Trout/male 47.0 cm 42.5 cm 2 lb 12.8 oz 6.40 oz	DLX-BR-1FD (dup.) Brown Trout/male 47.0 cm 42.5 cm 2 lb 12.8 oz 5.15 oz
Aluminum	(Al)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Antimony	(Sb)	--	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Arsenic	(As)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Barium	(Ba)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Beryllium	(Be)	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium	(Cd)	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Calcium	(Ca)	68.6 - 86.9	86.3	76.9	98.9	64.8	63.0	75.8	78.5
Chromium	(Cr)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cobalt	(Co)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Copper	(Cu)	--	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iron	(Fe)	5.5 - 7.7	[6.8]	[3.6]	[6.4]	[8.2]	[7.3]	[7.3]	[6.4]
Lead	(Pb)	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Magnesium	(Mg)	254 - 302	303	304	319	257	229	263	271
Manganese	(Mn)	0.49 - 0.52	1.0 U	1.0 U	[0.55]	1.0 U	1.0 U	1.0 U	1.0 U
Mercury	(Hg)	0.017 - 0.063	0.051 J	0.033 UJ	0.033 UJ	0.077 J	0.086 J	0.033 UJ	0.033 UJ
Nickel	(Ni)	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Potassium	(K)	4,329 - 4,648	4,420	4,550	4,820	4,580	4,250	4,490	4,530
Selenium	(Si)	--	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Silver	(Ag)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sodium	(Na)	222 - 308	[278]	[201]	[201]	[278]	[312]	[355]	[227]
Thallium	(Tl)	--	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Vanadium	(V)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	(Zn)	2.5 - 3.2	3.7	2.9	3.3	2.7	2.4	2.8	2.4

J - The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U - The analyte was not detected above the CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)

TABLE 5
Upstream Fish Tissue Anal tic: Results-Rainbow Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

Sample No.: Species/Sex: Standard Length: Total Length: Total Weight: Fillet Weight:	Reference Upstream Rainbow Trout Tissue Value Range (95% Confidence Interval)	DLX-RB-1A Rainbow Trout/female 35.0 cm 37.5 cm 1 lb 6.5 oz 5.7 oz	DLX-RB-1B Rainbow/female 36.5 cm 40.5 cm 1 lb 9.55 oz 8.25 oz	DLX-RB-1C Rai ow ale .0 c 37.0 cm 1 7.7 z .1 o	DLX-RB-1D Rainbow/female 35.0 cm 38.5 cm 1 lb 5.85 oz 5.4 oz	DLX-RB-1E Rainbow/female 35.5 cm 38.5 cm 2 lb 6.8 oz 6.25 oz	DLX-RB-1F Rainbow/female 35.5 cm 39.0 cm 1 lb 3.7 oz 2.55 oz	DLX-RB-1FD (dup.) Rainbow/female 35.5 cm 39.0 cm 1 lb 3.7 oz 1.8 oz
Aluminum (Al)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Antimony (Sb)	--	6.0 U	6.0 U	.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Arsenic (As)	--	10.0 U	10.0 U	0.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Barium (Ba)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Beryllium (Be)	--	0.20 U	0.20 U	20	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium (Cd)	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Calcium (Ca)	71.3 - 101.1	84.4	92.5	57.1	121	96.5	74.2	77.7
Chromium (Cr)	--	1.0 U	1.0 U	.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cobalt (Co)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Copper (Cu)	--	2.0 U	2.0 U	.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iron (Fe)	5.8 - 7.1	[5.0]	[6.8]	[7.3]	[7.3]	[6.4]	[5.9]	[6.4]
Lead (Pb)	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Magnesium (Mg)	268 - 274	274	263	274	274	273	274	269
Manganese (Mn)	0.49 - 0.71	1.0 U	1.0 U	[0.81]	1.0 U	[0.83]	1.0 U	[0.56]
Mercury (Hg)	0.017 - 0.036	0.041 J	0.033 UJ	0.033 UJ	0.033 UJ	0.033 UJ	0.043 J	0.035 J
Nickel (Ni)	--	4.0 U	4.0 U	.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Potassium (K)	4,140 - 4,531	4,630	4,050	4,010	4,230	4,450	4,680	4,300
Selenium (Si)	--	20.0 U	20.0 U	0.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Silver (Ag)	--	1.0 U	1.0 U	.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sodium (Na)	204 - 264	[215]	[213]	[221]	[235]	[324]	[204]	[227]
Thallium (Tl)	--	200 U	200 U	00 U	200 U	200 U	200 U	200 U
Vanadium (V)	--	1.0 U	1.0 U	.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc (Zn)	3.2 - 3.5	2.9	3.2	3.5	3.4	3.7	3.4	3.3

J - The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U - The analyte was not detected above the CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefor an e mate (qualified by laboratory)

TABLE 6
Downstream Fish Tissue Analytical Results-Brown Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

Sample No.: Species/Sex: Standard Length: Total Length: Total Weight: Fillet Weight:	Reference Downstream Brown Trout Tissue Value Range (95% Confidence Interval)	DLX-BR-2A Brown Trout/female 41.5 cm 45.5 cm 2 lb 6.25 oz 10.4 oz	DLX-BR-2B Brown Trout/female 41.5 cm 45.5 cm 2lb 1.3 oz 9.20 oz	DLX-BR-2C Brown Trout/male 38.0 cm 42.5 cm 1 lb 13.9 oz 7.30 oz	DLX-BR-2D Brown Trout/female 40.0 cm 44.0cm 2 lb 2.65 oz 8.30 oz	DLX-BR-2E Brown Trout/female 44.0 cm 47.0 cm 3 lb 9.8 oz 10.95 oz	DLX-BR-2F Brown Trout/male 47.5 cm 51.5 cm 4 lb 4.0 oz 7.05 oz	DLX-BR-2FD (dup.) Brown Trout/male 47.5 cm 51.5 cm 4 lb 4.o oz 6.0 oz
Aluminum (Al)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Antimony (Sb)	--	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Arsenic (As)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Barium (Ba)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Beryllium (Be)	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium (Cd)	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Calcium (Ca)	76.8 - 212.9	110	229	312	130	57.1	89.5	86.3
Chromium (Cr)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cobalt (Co)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Copper (Cu)	--	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iron (Fe)	5.4 - 7.8	[7.3]	[9.1]	[5.0]	[5.9]	[5.0]	[8.2]	[5.9]
Lead (Pb)	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Magnesium (Mg)	251 - 288	274	256	274	319	256	241	267
Manganese (Mn)	0.48 - 0.57	1.0 U	[0.67]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Mercury (Hg)	0.044 - 0.073	0.039 J	0.047 J	0.057 J	0.051 J	0.10 J	0.057 J	0.061 J
Nickel (Ni)	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Potassium (K)	4,264 - 4,796	4,830	4,300	4,730	4,760	4,400	3,870	4,820
Selenium (Si)	--	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Silver (Ag)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sodium (Na)	245 - 309	[315]	[232]	[255]	[340]	[224]	[270]	[303]
Thallium (Tl)	--	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Vanadium (V)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc (Zn)	2.5 - 3.9	3.7	5.0	2.9	3.0	2.5	2.8	2.3

J - The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U - The analyte was not detected above the CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)

TABLE 7
Downstream Fish Tissue Analytical Results-Rainbow Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

Sample No.: Species/Sex: Standard Length: Total Length: Total Weight: Fillet Weight:		Reference Downstream Rainbow Trout Tissue Value Range (95% Confidence Interval)	DLX-RB-2A Rainbow Trout/female 38.3 cm 42.5 cm 1 lb 8.455 oz 6.10 oz	DLX-RB-2B Rainbow Trout/male 31.5 cm 35.0 cm 1 lb 4.2 oz 4.85 oz	DLX-RB-2C Rainbow Trout/male 37.0 cm 41.0 cm 1 lb 12.95 oz 8.40 oz	DLX-RB-2D Rainbow Trout/female 30.0 cm 33.5cm 15.40 oz 4.90 oz	DLX-RB-2E Rainbow Trout/male 39.5 cm 43.0 cm 1 lb 5.1 oz 6.3 oz	DLX-RB-2F Rainbow Trout/male 40.0 cm 44.0 cm 2 lb 2.1 oz 5.75 oz	DLX-RB-2FD (dup.) Rainbow Trout/male 40.0 cm 44.0 cm 2 lb 2.1 oz 4.0 oz
Aluminum	(Al)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Antimony	(Sb)	--	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Arsenic	(As)	--	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Barium	(Ba)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Beryllium	(Be)	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Cadmium	(Cd)	--	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Calcium	(Ca)	82.7 - 140.7	126	72.3	107	191	84.1	108	93.5
Chromium	(Cr)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cobalt	(Co)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Copper	(Cu)	--	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Iron	(Fe)	4.5 - 17.5	28.3	[6.8]	[3.2]	[6.8]	10.0	16.4	[5.5]
Lead	(Pb)	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Magnesium	(Mg)	262 - 325	263	274	356	303	226	320	310
Manganese	(Mn)	0.49 - 0.54	1.0 U	1.0 U	1.0 U	[0.59]	1.0 U	1.0 U	1.0 U
Mercury	(Hg)	0.014 - 0.024	0.033 UJ	0.033 UJ	0.033 UJ	0.033 UJ	0.033 UJ	0.033 UJ	0.035 J
Nickel	(Ni)	--	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Potassium	(K)	4,297 - 4,715	4,360	4,360	4,880	4,460	4,060	4,780	4,640
Selenium	(Si)	--	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U	20.0 U
Silver	(Ag)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Sodium	(Na)	203 - 300	[306]	[287]	[190]	[221]	[336]	[266]	[153]
Thallium	(Tl)	--	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Vanadium	(V)	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	(Zn)	3.3 - 4.7	5.8	3.6	3.9	4.2	4.5	3.3	2.9

J - The associated numerical value is an estimated quantity because quality control criteria were not met. Presence of the analyte is reliable.
U - The analyte was not detected above the CRDL
[ ] - The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate (qualified by laboratory)

TABLE 8
Fish Tissue 95% Confidence Intervals - Brown Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

	Reporting Limit	Reference Upstream Brown Trout Tissue Value Range (95% Confidence Interval)	Reference Downstream Brown Trout Tissue Value Range (95% Confidence Interval)	Food Chain Reference Dose /Screening Concentration (SCDM 1995)	Food Chain Cancer Risk Screening Concentration (SCDM 1995)
Aluminum (Al)	10 U	--	--	--	--
Antimony (Sb)	6.0 U	--	--	0.54	--
Arsenic (As)	10.0 U	--	--	0.41	0.0021
Barium (Ba)	1.0 U	--	--	95	--
Beryllium (Be)	0.20 U	--	--	6.8	0.00073
Cadmium (Cd)	0.50 U	--	--	0.68	--
Calcium (Ca)	20.0 U	68.6 - 86.9	76.8 - 212.9	--	--
Chromium (Cr)	1.0 U	--	--	--	--
Cobalt (Co)	1.0 U	--	--	--	--
Copper (Cu)	2.0 U	--	--	--	--
Iron (Fe)	10.0 U	5.5 - 7.7	5.4 - 7.8	--	--
Lead (Pb)	5.0 U	--	--	--	--
Magnesium (Mg)	20.0 U	254 - 302	251 - 288	--	--
Manganese (Mn)	1.0 U	0.49 - 0.52	0.48 - 0.57	6.8	--
Mercury (Hg)	0.033 U	0.017 - 0.063	0.044 - 0.073	0.41	--
Nickel (Ni)	4.0 U	--	--	27.0	--
Potassium (K)	500 U	4,329 - 4,648	4,264 - 4,796	--	--
Selenium (Si)	20.0 U	--	--	6.8	--
Silver (Ag)	1.0 U	--	--	6.8	--
Sodium (Na)	500 U	222 - 308	245 - 309	--	--
Thallium (Tl)	200 U	--	--	--	--
Vanadium (V)	1.0 U	--	--	9.5	--
Zinc (Zn)	2.0 U	2.5 - 3.2	2.5 - 3.9	410	--

-- = Values were reported as non-detect at the reporting limit specified in the Table

TABLE 9
Fish Tissue 95% Confidence Intervals - Rainbow Trout
Animas River
Concentrations in mg/kg (ppm) - October 1997

	Reporting Limit	Reference Upstream Rainbow Trout Tissue Value Range (95% Confidence Interval)	Reference Downstream Rainbow Trout Tissue Value Range (95% Confidence Interval)	Food Chain Reference Dose /Screening Concentration (SCDM 1995)	Food Chain Cancer Risk Screening Concentration (SCDM 1995)
Aluminum (Al)	10 U	--	--	--	--
Antimony (Sb)	6.0 U	--	--	0.54	--
Arsenic (As)	10.0 U	--	--	0.41	0.0021
Barium (Ba)	1.0 U	--	--	95	--
Beryllium (Be)	0.20 U	--	--	6.8	0.00073
Cadmium (Cd)	0.50 U	--	--	0.68	--
Calcium (Ca)	20.0 U	71.3 - 101.1	82.7 - 140.7	--	--
Chromium (Cr)	1.0 U	--	--	--	--
Cobalt (Co)	1.0 U	--	--	--	--
Copper (Cu)	2.0 U	--	--	--	--
Iron (Fe)	10.0 U	5.8 - 7.1	4.5 - 17.5	--	--
Lead (Pb)	5.0 U	--	--	--	--
Magnesium (Mg)	20.0 U	268 - 274	262 - 325	--	--
Manganese (Mn)	1.0 U	0.49 - 0.71	0.49 - 0.54	6.8	--
Mercury (Hg)	0.033 U	0.017 - 0.036	0.014 - 0.024	0.41	--
Nickel (Ni)	4.0 U	--	--	27.0	--
Potassium (K)	500 U	4,140 - 4,531	4,297 - 4,715	--	--
Selenium (Si)	20.0 U	--	--	6.8	--
Silver (Ag)	1.0 U	--	--	6.8	--
Sodium (Na)	500 U	204 - 264	203 - 300	--	--
Thallium (Tl)	200 U	--	--	--	--
Vanadium (V)	1.0 U	--	--	9.5	--
Zinc (Zn)	2.0 U	3.2 - 3.5	3.3 - 4.7	410	--

-- = Values were reported as non-detect at the reporting limit specified in the Table

APPENDIX A

Sampling Activities Report

SAMPLING ACTIVITIES REPORT
for the
EXPANDED SITE INSPECTION
of the
DURANGO LEAD SMELTER
DURANGO, COLORADO
CERCLIS ID # CO0001399633
October 21-23, 1997

INTRODUCTION

The Sampling and Analysis Plan (SAP) for the Durango Lead Smelter expanded site inspection (ESI) was approved by the U.S. Environmental Protection Agency (EPA) Site Assessment Manager (SAM), Thomas Strauss on September 12, 1997. Field activities were conducted the week of October 20, 1997 by URS Operating Services (UOS) staff. The field team consisted of Mark Rudolph, (Field Team Leader), Kevin Mackey (Health and Safety Coordinator), Sabrina Forrest (Field Sampler), and Corey Terry (Field Sampler).

All field work was conducted in Level D with PPE consisting of steel toed boots and safety glasses. During the field sampling activities the weather was sunny and mild with temperatures in the fifty degree Fahrenheit range with very light breezes. Decontamination was a four step process beginning with a soapy wash, followed by a dionized water (DI) rinse, followed by a nitric acid rinse, followed by a final DI rinse

The field team collected surface water, sediment, and fish tissue samples, gauged the flow of Lightner Creek, and identified and delineated wetlands along the surface water pathway.

Samples for inorganic analysis (Case # 25768) were shipped to Sentinel Inc. of Huntsville, Alabama on October 22, 1997. Samples for total organic carbon (TOC) analysis (ULSA # V8-980004) were shipped to ACCU Labs Research of Golden, Colorado on October 22, 1997. Fish tissue samples, that were analyzed for total metals, were shipped to Quanterra Inc. of Arvada, Colorado on November 4, 1997. All samples were shipped and received by the laboratories without incident.

SAMPLING ACTIVITIES

The attached chain-of custody forms (Attachment A) contain the shipment information for all samples collected during this ESI. Figure 2 shows the actual sample locations. Sampling activities included the collection of 55 samples, specifically 10 surface water samples, 10 collocated sediment samples, 28 fish tissue samples, and 7 Quality Assurance/Quality Control (QA/QC) samples (one duplicate surface water sample, two rinsate blanks, and four duplicate fish tissue samples).

SURFACE WATER and SEDIMENT SAMPLES

Colocated surface water and sediment samples were collected at nine locations along the Animas River and at one location on Lightner Creek (Figure 2). The sample locations and rationale are presented in Table 1. Results of the surface water quality parameters taken in the field are presented in Table 2.

A review of the field readings of surface water quality data collected in the field indicates that the pH and conductivity of the Lightner Creek sample (DLX-LC-SW-01) are higher than the readings for the Animas River and that Lightner Creek appears to have an affect upon the first Animas River sample station (DLX-SW-02) immediately downstream of the confluence of Lightner Creek with the Animas River. It can also be noted that the pH, temperature and conductivity tended to increase as the sampling proceeded upstream beginning at 10:00 am and finishing at 1:00 pm. The daily warming cycle is probably responsible for the increase in surface water temperature and probably influenced the upward creep in pH and conductivity readings. None of the changes in the field readings of water quality parameters appear to be related to site influences.

The background sample on the Animas River (DLX-SW/SE-01) was collected from the west bank of the river approximately 0.25 mile upstream of site influences. The MS/MSD was collected at the background location. The background sample on Lightner Creek (DLX-LC-SW/SE-01) was collected from approximately 0.60 mile upstream of the confluence of Lightner Creek and the Animas River adjacent to the Best Western Motel parking lot. The sample collected from the site probable point of entry (PPE) into the Animas River (DLX-SW/SE-02) was collected from a point immediately below the Smelter Rapids. Sample DLX-SW/SE-03 was collected from the west bank of the Animas River approximately 55 yards downstream of the Smelter Rapids. Sample DLX-SW/SE-04 was collected from the west bank of the Animas River immediately across the stream from the Main Wastewater Treatment Plant Building. Sample DLX-SW/SE-05 was collected from the west bank of the Animas River just upstream and across the river from the Park Visitors Center. Sample DLX-SW/SE-06 was collected from the west

bank of the Animas River approximately 30 yards upstream of the wastewater discharge into the Animas River. Sample DLX-SW/SE--07 was collected from the west bank of the Animas River from a location that is approximately 15 yards downstream of the City Park boat launch. Sample DLX-SW/SE-08 was collected from the west bank of the Animas River from a location that is approximately 170 yards downstream of sample station DLX-SW/SE-07. The most downstream sample location was DLX-SW/SE-09 which is located on the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge. Each of the surface water-sediment sample locations downgradient of the site PPE was space approximately 500 feet from the adjacent sample location.

FISH TISSUE SAMPLES

Fish tissue samples were collected from both brown and rainbow trout at upgradient and downgradient segments along the Animas River (Table 1 and Figure 1). The fish were collected by employing an electro-shock method from a 16-foot self-bailing raft The raft was owned and operated the U.S. Bureau of Reclamation Durango field office crew. The fish collection areas were changed from the approved sample plan locations because of the access requirements for the Bureau of Reclamation crew's boat. The upgradient (background) fish sampling reach was located between seven and nine miles upstream of the site. The downgradient (potentially affected) fish sampling reach was located between three and one half and five miles downstream of the site.

The upgradient (background) fish tissue samples were collected on October 22, 1997 and were

prepared and preserved with dry ice the evening of October 22, 1997. The downgradient fish tissue samples were collected and prepared on October 23, 1997 and also preserved with dry ice.

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

A total of seven QA/QC samples were collected for this ESI. More specifically one duplicate surface water sample, one rinsate blank for sediment sampling equipment, one rinsate blank for fish tissue preparation equipment, one rainbow trout background duplicate sample, one brown trout background duplicate sample, one rainbow trout downstream duplicate sample, and one brown trout downstream duplicate sample were all collected for this ESI (Table 1). The surface water duplicate sample, DLX-SW-10, was collected at sample station DLX-SW-08. The rinsate blank sample for sediment sampling equipment, DLX-SW-11, was collected after decontamination of sampling equipment following the collection of DLX-LC-SE-01. The rinsate blank sample for the fish sampling equipment, DLX-BRRB-1 was collected prior to preparation of fish tissue samples. Duplicate fish tissue samples DLX-BR-1FD, DLX-BR-2FD, DLX-RB-1FD, and DLX-RB-2FD were collected from the left half of the fish where the right halves were samples DLX-BR-1F, DLX-BR-2F, DLX RB-1F, and DLX-RB-2F, respectively.

FIELD OBSERVATIONS

Slag from the site was observed to be actively eroded by the Animas River at the site PPE Slag from the site was observed in the River and photographs were taken to document this observed

release and will be included in the Analytical Results Report (ARR)

Stream side emergent and scrub/shrub wetlands were observed and documented along the west bank of the Animas River between sample location DLX-SW/SE-09 to approximately thirty five yards downstream of Smelter Rapids.

No unusual physical abnormalities were observed in the fish collected for this ESI. The fish habitat and overall health appeared to be in good in the fish collected from the downgradient fish sampling reach.

TABLE 1
Sample Locations and Rationale

Matrix	Sample #	Location	Rationale
Surface Water Samples	DLX-SW-1 MS/MSD	Collected from the west bank of the Animas River, approximately 0.25 miles upstream of the site PPE.	Document background conditions along the Animas River. The MS/MSD collected to test the precision of lab analytical methods.
	DLX-LC-SW-1	Background sample collected from Lightner Creek approximately 0.60 mile upstream from confluence with Animas River.	Document background conditions on Lightner Creek before it discharges into the Animas River.
	DLX-SW-2	Collected from the west bank of the Animas River at the site PPE, immediately below Smelter Rapids.	Test for potential site impacts to Animas River wetlands and fishery.
	DLX-SW-3	Collected from the west bank of the Animas River approximately 55 yards downstream of Smelter Rapids.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-4	Collected from the west bank of the Animas River at the Waste Water Treatment Plant.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-5	Collected from the west bank of the Animas River at the Park Visitors Center.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-6	Collected from the west bank of the Animas River just upstream of the Waste Water Treatment Plant discharge.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-7	Collected from the west bank of the Animas River approximately 15 yards downstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-8	Collected from the west bank of the Animas River approximately 500 feet downstream of the sample point DLX-SW-07.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SW-9	Collected from the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge.	Test for extent of site impacts to Animas River wetlands and fishery.
Sediment Samples	DLX-SE-1 (MS/MSD)	Collected from the west bank of the Animas River, approximately 0.25 miles upstream of the site PPE.	Document background conditions along the Animas River. The MS/MSD collected to test the precision of lab analytical methods.
	DLX-LC-SE-1	Background sample collected from Lightner Creek, approximately 0.60 mile upstream from confluence with Animas River.	Document background conditions on Lightner Creek before it discharges into the Animas River.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Sediment Samples (continued)	DLX-SE-2	Collected from the west bank of the Animas River at the site PPE immediately below Smelter Rapids.	Test for potential site impacts to Animas River wetlands and fishery.
	DLX-SE-3	Collected from the west bank of the Animas River approximately 55 yards downstream of Smelter Rapids.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-4	Collected from the west bank of the Animas River at the Waste Water Treatment Plant.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-5	Collected from the west bank of the Animas River at the Park Visitors Center.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-6	Collected from the west bank of the Animas River just upstream of the Waste Water Treatment Plant discharge.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-7	Collected from the west bank of the Animas River approximately 15 yards downstream of the City Park boat launch.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-8	Collected from the west bank of the Animas River approximately 500 feet downstream of DLX-SE-07.	Test for extent of site impacts to Animas River wetlands and fishery.
	DLX-SE-9	Collected from the west bank of the Animas River approximately 20 yards upstream of the Santa Rita Bridge.	Test for extent of site impacts to Animas River wetlands and fishery.
Brown Trout Fish Tissue Samples	DLX-BR-1A	Background brown trout fish tissue sample collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1B	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1C	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1D	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Brown Trout Fish Tissue samples (continued)	DLX-BR-1E	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-1F	Background brown trout fish tissue sample to be collected from the Animas River approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-BR-2A (MS/MSD)	Brown trout fish tissue sample to be collected from the Animas River between 3.5 to 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2B	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2C	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2D	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2E	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-BR-2F	Brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
Rainbow Trout Fish Fillet Samples	DLX-RB-1A	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 to 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1B	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Brown Trout Fish Tissue samples (continued0	DLX-RB-1C	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1D	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1E	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-1F	Background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 and 9.0 miles upstream of the DLS site.	Establish background values for fish tissue on the Animas River.
	DLX-RB-2A (MS/MSD)	Rainbow trout fish tissue sample to be collect ed from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2B	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish speciesdownstream of the site PPE.
	DLX-RB-2C	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2D	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2E	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-2F	Rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE.	Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

TABLE 1
Sample Locations and Rationale
(continued)

Matrix	Sample #	Location	Rationale
Surface Water and Sediment QA/QC Samples	DLX-SW-10	Surface water duplicate of DLX-SW-8.	Quality Assurance sample to document the ability to collect collocated samples in the field.
	DLX-SW-11	Rinsate Blank from sediment sampling equipment.	Document thoroughness of decontamination process.
Trout Species QA/QC Samples	DLX-BRRB-1	Rinsate Blank from fish tissue sampling equipment.	Document thoroughness of decontamination process.
	DLX-BR-1FD Brown Trout Duplicate	Duplicate background brown trout fish tissue sample to be collected from the Animas River between 7.0 and 9.0 miles upstream of the DLS site. Duplicate of DLX-BR-1F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Establish background values for fish tissue on the Animas River.
	DLX-BR-2FD Brown Trout Duplicate	Duplicate brown trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE. Duplicate of DLX-BR-2F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.
	DLX-RB-1FD Rainbow Trout Duplicate QA/QC Sample	Duplicate background rainbow trout fish tissue sample to be collected from the Animas River between approximately 7.0 to 9.0 miles upstream of the DLS site. Duplicate of DLX-RB-1F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Establish background values for fish tissue on the Animas River.
	DLX-RB-2FD Rainbow Trout Duplicate QA/QC Sample	Duplicate rainbow trout fish tissue sample to be collected from the Animas River between 3.5 and 5.0 miles downstream of the site PPE. Duplicate of DLX-RB-2F.	Document the ability to collect collocated samples from fish tissue and to test for the variability of metals bioaccumulation from the left to right halves of the fish. Test for bioaccumulation of metals in fish tissue from Animas River fish species downstream of the site PPE.

Table 2
Field Readings of Water Quality Parameters
Durango Lead Smelter ESI
October 21, 1997

Location	DLX-SW-01 Animas River Background	DLX-LC-SW-01 Lightner Creek Background	DLX-SW-02 Animas River at PPE	DLX-SW-03 Animas River approximately 55 yards downstream from PPE	DLX-SW-04 Animas River at Waste Water Treatment Plant	DLX-SW-05 Animas River at Park Visitors Center	DLX-SW-06 Animas River at wastewater treatment discharge	DLX-SW-07 Animas River downstream of city park boat launch	DLX-SW-08 Animas River approximately 500 feet downstream of DLX-SW-07	DLX-SW-09 Animas River approximately 20 yards upstream of Santa Rita Bridge
Sample time	1320	1300	1215	1150	1135	1110	1050	1035	1025	1015
pH	7.40	7.70	7.08	6.94	7.02	6.92	6.87	6.90	6.88	7.02
Temperature ° F	53.9	54.0	53.4	51.1	51.3	51.1	49.4	48.0	46.5	46.2
Conductivity $\mu s/cm^2$	414	683	607	404	429	403	399	392	389	390

All samples from Animas River except DLX-LC-SW-01 which was collected from Lighter Creek (LC)

ATTACHMENT A

CHAIN-OF-CUSTODY FORMS

EPA — Inorganic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Inorganic CLP Analysis)

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier	SAS No. (if applicable)	Case No.
DL4	70510	V05	V05	10/22/97	Fed Ex	—	25768

Regional Information	Sampler (Name)	Airbill Number
—	Mark Rudolph	320647 7013

Non-Superfund Program	Sampler Signature	5. Ship To
		(205) 534-9800 Sentinel Inc. 2800 Bob Wallace Ave, Suite L3 Huntsville, AL 35805 ATTN: Beverly Kilgore

Site Name	3. Purpose*	Early Action	Long-Term Action
Durango Lead Smelter	Lead: [X] SF, [ ] PRP, [ ] ST, [ ] FED	[ ] CLEM, [ ] PA, [ ] REM, [ ] RI, [ ] SI, [X] ESI	[ ] FS, [ ] RD, [ ] RA, [ ] O&M, [ ] NPLD

City, State	Site Spill ID
Durango, CO	85ZZ

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, S = Spike, D = Duplicate, R = Rinsate, PE = Perform. Eval., — = Not a QC Sample)
MHDL88	1	L	G	2		X						8-153759, 60	DLX-SW-1	10/21/97 1320	—	MK	—
MHDL89						X						8-153761	DLX-LC-SW-1	1300	—	MK	—
MHDL90						X						8-153762	DLX-SW-2	1215	—	MK	—
MHDL91						X						8-153763	DLX-SW-3	1150	—	MK	—
MHDL92						X						8-153764	DLX-SW-4	1135	—	MK	—
MHDL93						X						8-153765	DLX-SW-5	1110	—	MK	—
MHDL94						X						8-153766	DLX-SW-6	1050	—	MK	—
MHDL95						X						8-153767	DLX-SW-7	1035	—	MK	—
MHDL96						X						8-153768	DLX-SW-8	1025	—	MK	—
MHDL97						X						8-153769	DLX-SW-9	1015	—	MK	—

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
(Y/N)	1 of 3	MHDL88	—	—

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mark Rudolph	10/22/97 1200	Fed Ex			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - SMO Copy; Yellow - Lab Copy for Return to SMO

EPA Form 9110-1

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*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-5 REV. 3/93

361553

EPA — Inorganic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Inorganic CLP Analysis)

1. Project Code: DLX	Account Code: 70510	2. Region No.: 8	Sampling Co.: VOS	4. Date Shipped: 10/22/97	Carrier: Fed Ex
Regional Information: —		Sampler (Name): Mark Rudolph		Airbill Number: 320647 7013	
Non-Superfund Program: —		Sampler Signature:		5. Ship To: Sentinel Inc 2800 Bob Wallace Ave. Suite L3 Huntsville, AL 35805 (205) 534-9800 ATTN: Beverly Kilgore	
Site Name: Durango Lead Smelter		3. Purpose*: Lead — [X] SF, [ ] PRP, [ ] ST, [ ] FED; Early Action — [ ] CLEM, [ ] PA, [ ] REM, [ ] RI, [X] SI, [ ] ESI; Long-Term Action — [ ] FS, [ ] RD, [ ] RA, [ ] O&M, [ ] NPLD			
City, State: Durango, CO	Site Spill ID: 8577				

SAS No. (if applicable): —

Case No.: 25768

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, S = Spike, D = Duplicate, R = Rinsate, PE = Perform. Eval., — = Not a QC Sample)
MHDL98	1	L	G	2		X						8-153770	DLX-SW-10	10/21/97 1025	—	MRR	D
MHDL99	1	↓	↓	↓		X						8-153771	DLX-SW-11	1315	—	MR	R
MHDJ19	1					X						8-153772	DLX-BRB-1	1450	—	MR	R
MHDJ20	5			6		X						8-153773, 83	DLX-SE-1	1320	—	MRR	—
MHDJ21	↓			↓		X						8-153774	DLX-LC-SE-1	1300	—	MRR	—
MHDJ22						X						8-153775	DLX-SE-2	1215	—	MRR	—
MHDJ23						X						8-153776	DLX-SE-3	1150	—	MRR	—
MHDJ24						X						8-153777	DLX-SE-4	1135	—	MRR	—
MHDJ25						X						8-153778	DLX-SE-5	1110	—	MRR	—
MHDJ26	↓	↓	↓	↓		X						8-153779	DLX-SE-6	1050	—	MRR	—

Shipment for Case Complete? (Y/N)	Page	Sample(s) to be Used for Laboratory QC	Additional Sampler Signatures	Chain of Custody Seal Number(s)
(Y)	2 of 3	MHDJ20	—	—

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mark R	10/22/97 1200	Fed Ex			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - SMO Copy; Yellow - Lab Copy for Return to SMO

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*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-5 REV. 3/93

201562

EPA United States Environmental Protection Agency
Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record
(For Inorganic CLP Analysis)

Case No. 25768

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
DLX	70510	8	UOS	10/22/97	Fed EX

Regional Information: —

Sampler (Name): Mark Rudolph

Airbill Number: 320647 7013

Non-Superfund Program: —

Sampler Signature: Mark Rudolph

Site Name: Durango Lead Smelter

3. Purpose*
- Lead: [X] SF [ ] PRP [ ] ST [ ] FED
- Early Action: [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI
- Long-Term Action: [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD

5. Ship To
Sentinel Inc
2800 Bob Wallace Ave, Suite L3
Huntsville, AL 35805
(205) 534-9800
ATTN: Beverly Kilgore

City, State: Durango, CO

Site Spill ID: 8JZZ

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, S = Spike, D = Duplicate, R = Rinsate, PE = Perform. Eval., — = Not a QC Sample)
MHDW27	5	L	G	6		X						8-153780	DLX-SE-7	10/21/97 1035	—	MR	—
MHDW23	↓	↓	↓	↓		X						8-153781	DLX-SE-8	10/21/97 1025	—	MR	—
MHDW24	↓	↓	↓	↓		X						8-153782	DLX-SE-9	10/21/97 1015	—	MR	—

Shipment for Case Complete? (Y/N)

Page 3 of 3

Sample(s) to be Used for Laboratory QC: —

Additional Sampler Signatures: —

Chain of Custody Seal Number(s): —

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Mark Rudolph	10/22/97 1200	Fed EX			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

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A21-012-13 REV.

264950

UOS URS Operating Services, Inc.
1099 18th Street, Suite 710, Denver, CO 80202

SHIP TO: AccuLabs Research / Tom Balka
4663 Table Mountain Dr Golden, CO 80205

CHAIN OF CUSTODY RECORD

PROJECT NO/NAME: 75.70510.00
Dianqo lead Smelter

SITE MANAGER: Mark Rudolph

SAMPLERS SIGNATURE:

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	TDC	MS/MSD (If needed)	Duplicate			Label #	TAG # REMARKS
DLX-SW-1	10/21/97	1320		X	DLX-SW-1	2	X	X				2611, 2613	8-153784, 85
DLX-LC-SW-1		1300		X	DLX-LC-SW-1	1	X					2612	8-153786
DLX-SW-2		1215		X	DLX-SW-2	1	X					2614	8-153787
DLX-SW-3		1150		X	DLX-SW-3	1	X					2615	8-153795
DLX-SW-4		1135		X	DLX-SW-4	1	X					2616	8-153788
DLX-SW-5		1110		X	DLX-SW-5	1	X					2617	8-153789
DLX-SW-6		1050		X	DLX-SW-6	1	X					2618	8-153790
DLX-SW-7		1035		X	DLX-SW-7	1	X					2619	8-153791
DLX-SW-8		1025		X	DLX-SW-8	1	X					2620	8-153792
DLX-SW-9		1015		X	DLX-SW-9	1	X					2621	8-153793
DLX-SW-10		1025		X	DLX-SW-10	1	X		X of DLX-SW-8			2622	8-153794

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
	10/22/97	1200	Fed EX				
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE	TIME	REMARKS: Fed EX AIRBILL NUMBER: 3206477002	

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White - Original to Accompany Samples Yellow - UOS Main Office Pink - UOS Field Office

DN 3590 ULSA # U8-980004

UOS URS Operating Services, Inc.
1099 18th Street, Suite 710, Denver, CO 80202

SHIP TO: Bob Weiber
Quanterra 4955 Yarrow St. Arvada, CO 80002

CHAIN OF CUSTODY RECORD

PROJECT NO/NAME: 75.70510.00
Durango Lead Smelter

SITE MANAGER: Mark Rudolph

SAMPLERS SIGNATURE:
Mark R

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	Total Metals	MS/MSD	Duplicate			Labed #	TAG # REMARKS
DLX-BR-1A	10/22/97	1830		X	DLX-BR-1A	1	X					2645	8-163121
DLX-BR-1B		1835		X	DLX-BR-1B	1	X					2646	8-163122
DLX-BR-1C		1845		X	DLX-BR-1C	1	X					2647	8-163123
DLX-BR-1D		1850		X	DLX-BR-1D	1	X					2648	8-163124
DLX-BR-1E		1900		X	DLX-BR-1E	1	X					2649	8-163125
DLX-BR-1F		1910		X	DLX-BR-1F	1	X					2650	8-163126
DLX-BR-1FD		1910		X	DLX-BR-1FD	1	X		X			2651	8-163127
DLX-RB-1A		1720		X	DLX-RB-1A	1	X					2652	8-163128
DLX-RB-1B		1735		X	DLX-RB-1B	1	X					2653	8-163129
DLX-RB-1C		1750		X	DLX-RB-1C	1	X					2654	8-163130
DLX-RB-1D		1800		X	DLX-RB-1D	1	X					2655	8-163131
DLX-RB-1E		1810		X	DLX-RB-1E	1	X					2656	8-163132
DLX-RB-1F		1820		X	DLX-RB-1F	1	X					2657	8-163133
DLX-RB-1FD		1820		X	DLX-RB-1FD	1	X		X			2658	8-163134

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
Mark R	11/4/97	1350					
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE	TIME	REMARKS: AIRBILL NUMBER:	

71-50906.00
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White - Original to Accompany Samples Yellow - UOS Main Office Pink - UOS Field Office

DN 3591

UOS URS Operating Services, Inc.
1099 18th Street, Suite 710, Denver, CO 80202

SHIP TO: Bob Weibel - Quanterra
4955 Yarrow St Arvada, CO 80002

CHAIN OF CUSTODY RECORD

PROJECT NO/NAME: 75.70510.00
Durango Lead Smelter

SITE MANAGER: Mark Rudolph

SAMPLERS SIGNATURE:
Mark Rudolph

STATION NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	Number of Containers	Total Metals	MS/MSD	Duplicate			Label #	Tag # REMARKS
DLX-BR-2A	10/23/97	1520		X	DLX-BR-2A	1	X	X				2631	8-163107
DLX-BR-2B		1525		X	DLX-BR-2B	1	X					2632	8-163108
DLX-BR-2C		1535		X	DLX-BR-2C	1	X					2633	8-163109
DLX-BR-2D		1545		X	DLX-BR-2D	1	X					2634	8-163110
DLX-BR-2E		1550		X	DLX-BR-2E	1	X					2635	8-163111
DLX-BR-2F		1600		X	DLX-BR-2F	1	X					2636	8-163112
DLX-BR-2FD		1600		X	DLX-BR-2FD	1	X		X			2637	8-163113
DLX-RB-2A		1420		X	DLX-RB-2A	1	X	X				2638	8-163114
DLX-RB-2B		1425		X	DLX-RB-2B	1	X					2639	8-163115
DLX-RB-2C		1435		X	DLX-RB-2C	1	X					2640	8-163116
DLX-RB-2D		1445		X	DLX-RB-2D	1	X					2641	8-163117
DLX-RB-2E		1500		X	DLX-RB-2E	1	X					2642	8-163118
DLX-RB-2F		1505		X	DLX-RB-2F	1	X					2643	8-163119
DLX-RB-2FD	↓	1505		X	DLX-RB-2FD	1	X		X			2644	8-163120

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
Mark Rudolph	11/4/97	1350					
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE	TIME	REMARKS: AIRBILL NUMBER:	

71-50906.00
RSTART\Forms\Custody.Fm.bas

White - Original to Accompany Samples Yellow - UOS Main Office Pink - UOS Field Office

DN 3586

APPENDIX B

Photolog

Photo 1. View upstream along Animas River from beneath Santa Rita Bridge at the most downstream sample location DLX-SW/SE-09.

Photo 2. View upstream along Animas River of UOS sampling crew (Mackey, Howley and Terry) collecting sample at DLX-SW/SE-08.

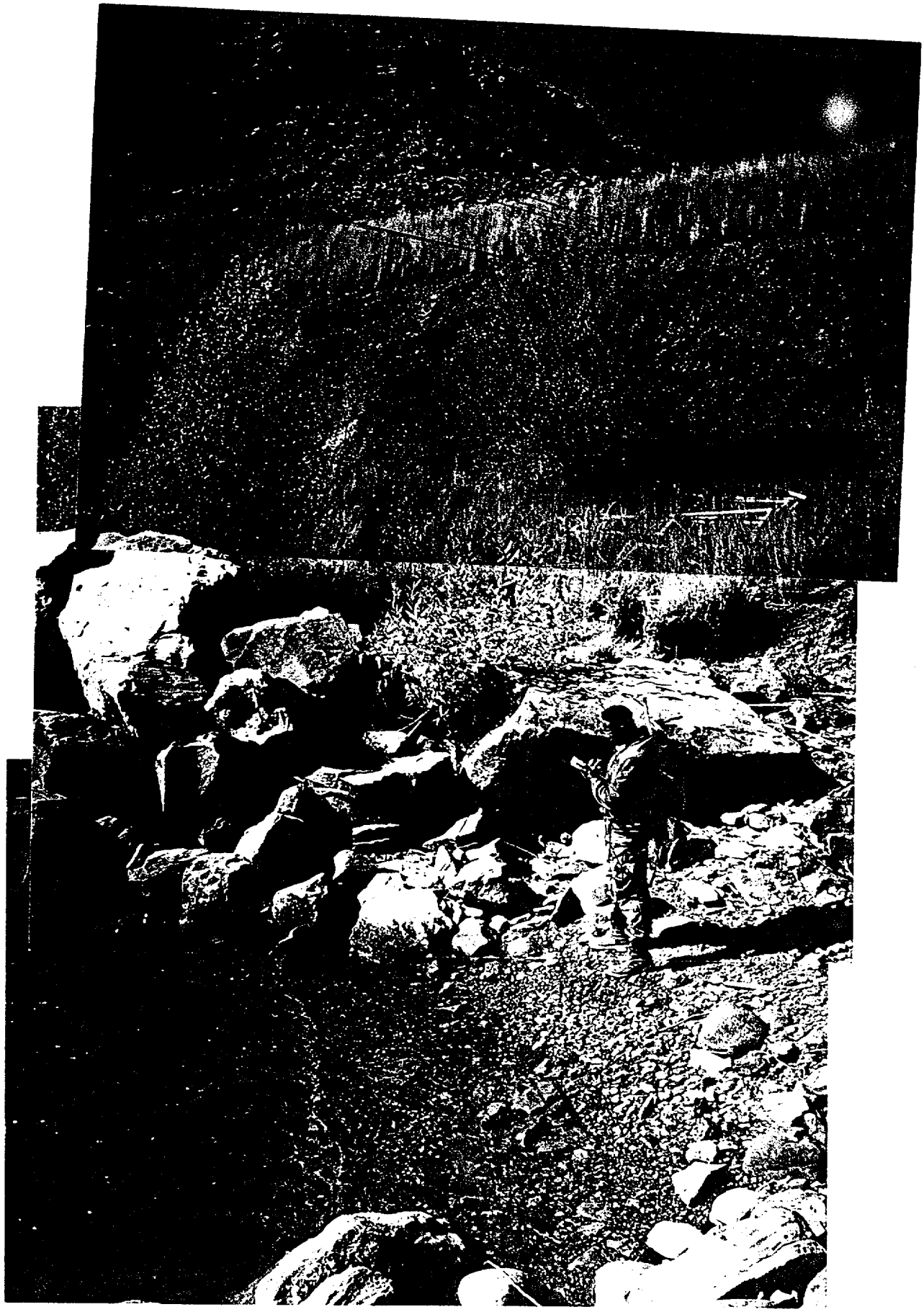


Photo 3. View of slag bank at the site along Animas River where slag material (grey layer beneath grass) is eroded and transported by the Animas River. C. Terry of UOS in foreground along river bank.

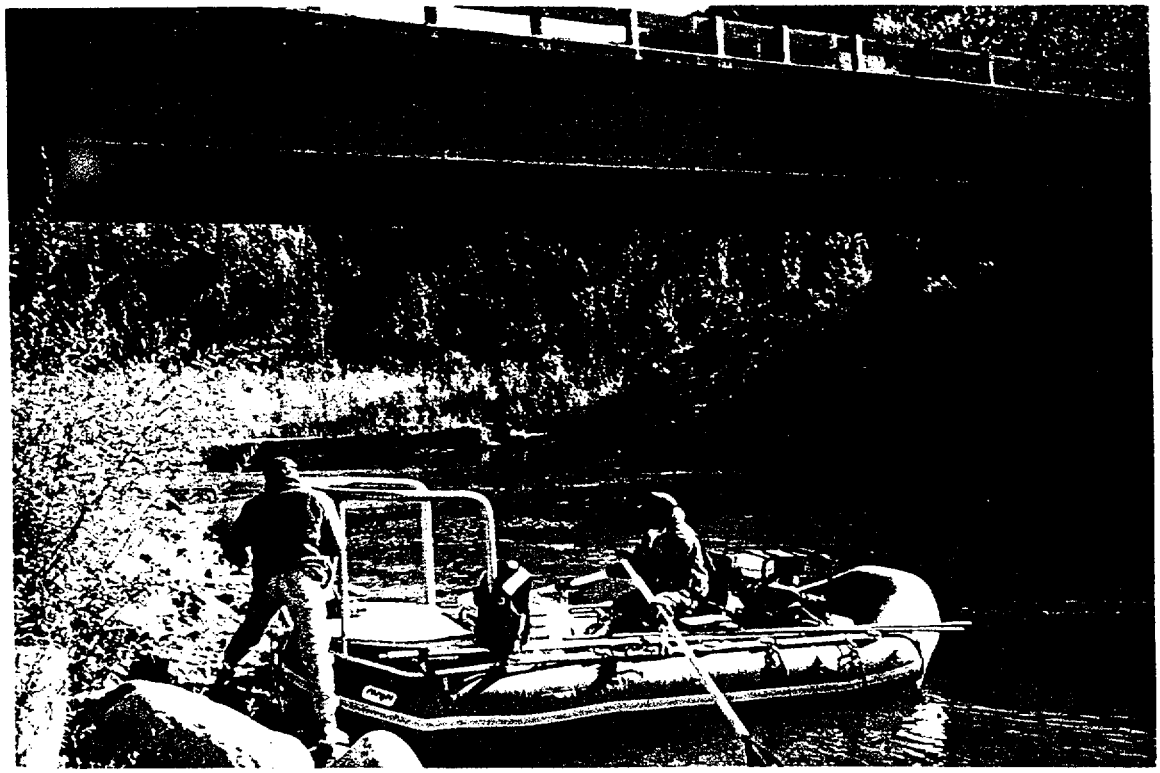
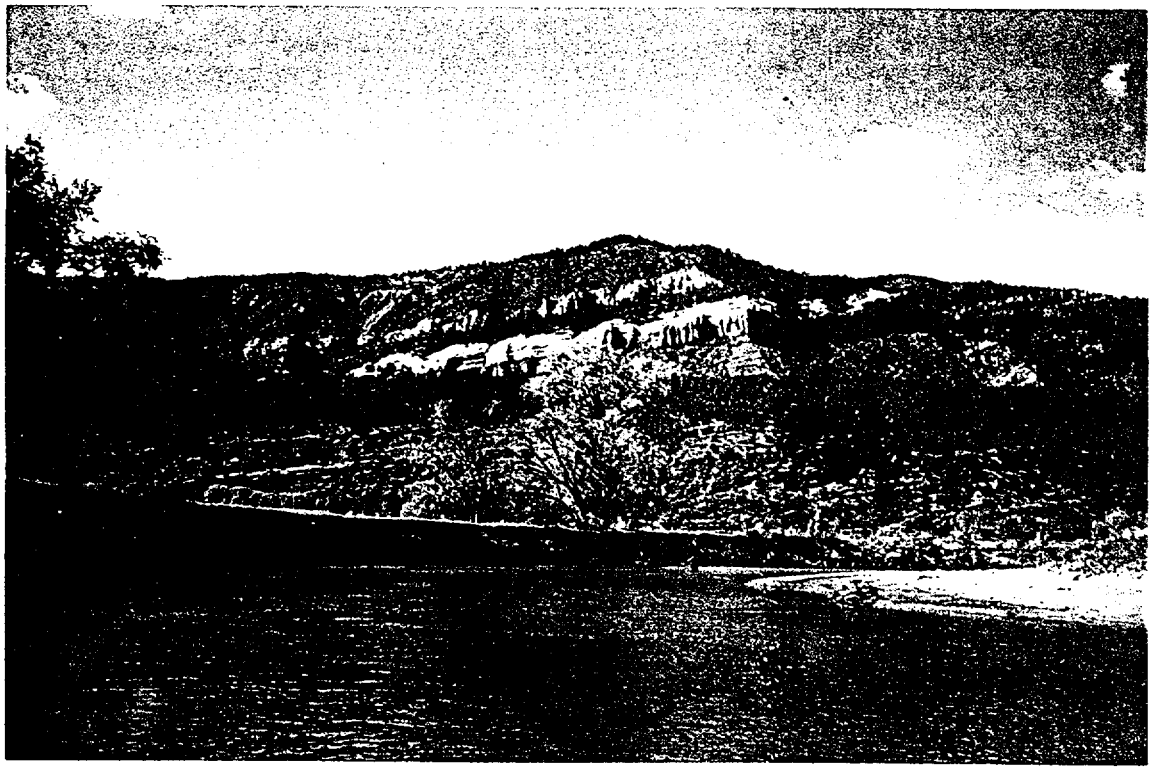


Photo 4. Raft with fish shocking equipment being launched into the Animas River.



Photograph No. 5. Upper fish tissue sampling reach along the Animas River north of Durango, Colorado.

Photograph No. 6. Fish shocking raft along downstream fish tissue collection reach.

APPENDIX C

Validation Reports and Laboratory Data
(under separate cover)

Table I-1. Mill Tailings Area (DUR01) Soil

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0915
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.14				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.1				-	-
Lead	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	8.58				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	6.98				-	-
Molybdenum	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.08	U			0.08	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.08	U			0.08	-
Selenium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.41	B			-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.49	B			-	-
Uranium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.36				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.34				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0915
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0916
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.25				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.21				-	-
Lead	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	13.8				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	12.7				-	-
Molybdenum	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.08	U			0.08	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.08	U			0.08	-
Selenium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.35	U			0.35	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.35	U			0.35	-
Uranium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.48				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.49				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0916
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0917
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	7.2				-	-
	mg/kg	11/18/2000	0002	4.00 - 5.00	CB(BT-1)	GM	4.17				-	-
Lead	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	79.6				-	-
	mg/kg	11/18/2000	0002	4.00 - 5.00	CB(BT-1)	GM	42.5				-	-
Molybdenum	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.88	B			-	-
	mg/kg	11/18/2000	0002	4.00 - 5.00	CB(BT-1)	GM	2.18				-	-
Selenium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	1.31				-	-
	mg/kg	11/18/2000	0002	4.00 - 5.00	CB(BT-1)	GM	1.29				-	-
Uranium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	21.8				-	-
	mg/kg	11/18/2000	0002	4.00 - 5.00	CB(BT-1)	GM	10.7				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0917
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0918
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.096	B			-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	5.15				-	-
Lead	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	5.67				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	6660				-	-
Molybdenum	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.096	B			-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	10.8				-	-
Selenium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.68				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	2.0				-	-
Uranium	mg/kg	11/18/2000	0001	3.00 - 3.00	CB(BT-1)	GM	0.35				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	42.4				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0918
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0919
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.76				-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	0.18				-	-
Lead	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	9.23				-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	7.37				-	-
Molybdenum	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.087	B			-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	0.08	U			0.08	-
Selenium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.56				-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	0.47	B			-	-
Uranium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	6.9				-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	3.24				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0919
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0920
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.25				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.17				-	-
Lead	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	14.7				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	6.47				-	-
Molybdenum	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.08	U			0.08	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.08	U			0.08	-
Selenium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.35	U			0.35	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.92				-	-
Uranium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.5				-	-
	mg/kg	11/18/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.3				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0920
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0921
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.22				-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	0.17				-	-
Lead	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	9.35				-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	9.1				-	-
Molybdenum	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.091	B			-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	0.08	U			0.08	-
Selenium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.64				-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	0.86				-	-
Uranium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	1.72				-	-
	mg/kg	11/18/2000	0002	4.00 - 4.00	CB(BT-1)	GM	0.72				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0921
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0922
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.2				-	-
	mg/kg	11/18/2000	0002	3.00 - 4.00	CB(BT-1)	GM	0.28				-	-
Lead	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	11.4				-	-
	mg/kg	11/18/2000	0002	3.00 - 4.00	CB(BT-1)	GM	11.7				-	-
Molybdenum	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.08	U			0.08	-
	mg/kg	11/18/2000	0002	3.00 - 4.00	CB(BT-1)	GM	0.08	U			0.08	-
Selenium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.37	B			-	-
	mg/kg	11/18/2000	0002	3.00 - 4.00	CB(BT-1)	GM	0.35	U			0.35	-
Uranium	mg/kg	11/18/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.76				-	-
	mg/kg	11/18/2000	0002	3.00 - 4.00	CB(BT-1)	GM	0.75				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0922
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0930
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	1.27				-	-
Lead	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	141				-	-
Molybdenum	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.5	B			-	-
Selenium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.6				-	-
Uranium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.77				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0930
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0931
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.85				-	-
Lead	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	13.6				-	-
Molybdenum	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.66	B			-	-
Selenium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.88				-	-
Uranium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	1.22				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0931
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0932
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.57				-	-
Lead	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	6.95				-	-
Molybdenum	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.13	B			-	-
Selenium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.72				-	-
Uranium	mg/kg	11/20/2000	0001	0.00 - 0.00	CB(BT-1)	GM	0.54				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0932
REPORT DATE: 12/12/2001 10:41 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM SILTY GRAVELS

LAB QUALIFIERS:

* Replicate analysis not within control limits.
\+ Correlation coefficient for MSA < 0.995.
A TIC is a suspected aldol-condensation product.
B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H Holding time expired, value suspect.
I Increased detection limit due to required dilution.
C Pesticide result confirmed by GC-MS.
M GFAA duplicate injection precision not met.
N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S Result determined by method of standard addition (MSA).
U Analytical result below detection limit.
W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D Analyte determined in diluted sample.
P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
> Result above upper detection limit.
J Estimated

DATA QUALIFIERS:

J Estimated value.
L Less than 3 bore volumes purged prior to sampling.
U Parameter analyzed for but was not detected.
F Low flow sampling method used.
R Unusable result.
G Possible grout contamination, pH > 9.
X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Table I-2. Raffinate Ponds Area (DUR02) Soil

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0903
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	09/25/2000	0001	4.00 - 6.00	CB(BT-1)	GP	0.041	B			-	-
	mg/kg	09/25/2000	0002	14.00 - 16.00	CB(BT-1)	SM	0.057	B			-	-
	mg/kg	09/25/2000	0003	23.00 - 26.00	CB(BT-1)	SM	2.17				-	-
	mg/kg	09/25/2000	0004	28.00 - 29.00	CB(BT-1)	GP	0.11				-	-
Lead	mg/kg	09/25/2000	0001	4.00 - 6.00	CB(BT-1)	GP	4.4				-	-
	mg/kg	09/25/2000	0002	14.00 - 16.00	CB(BT-1)	SM	4.81				-	-
	mg/kg	09/25/2000	0003	23.00 - 26.00	CB(BT-1)	SM	4.5				-	-
	mg/kg	09/25/2000	0004	28.00 - 29.00	CB(BT-1)	GP	10				-	-
Molybdenum	mg/kg	09/25/2000	0001	4.00 - 6.00	CB(BT-1)	GP	0.12	B			-	-
	mg/kg	09/25/2000	0002	14.00 - 16.00	CB(BT-1)	SM	0.11	B			-	-
	mg/kg	09/25/2000	0003	23.00 - 26.00	CB(BT-1)	SM	0.13	B			-	-
	mg/kg	09/25/2000	0004	28.00 - 29.00	CB(BT-1)	GP	0.12	B			-	-
Selenium	mg/kg	09/25/2000	0001	4.00 - 6.00	CB(BT-1)	GP	0.35	U			0.35	-
	mg/kg	09/25/2000	0002	14.00 - 16.00	CB(BT-1)	SM	0.35	U			0.35	-
	mg/kg	09/25/2000	0003	23.00 - 26.00	CB(BT-1)	SM	0.35	U			0.35	-
	mg/kg	09/25/2000	0004	28.00 - 29.00	CB(BT-1)	GP	0.35	U			0.35	-
Uranium	mg/kg	09/25/2000	0001	4.00 - 6.00	CB(BT-1)	GP	0.18				-	-
	mg/kg	09/25/2000	0002	14.00 - 16.00	CB(BT-1)	SM	0.18				-	-
	mg/kg	09/25/2000	0003	23.00 - 26.00	CB(BT-1)	SM	0.29				-	-
	mg/kg	09/25/2000	0004	28.00 - 29.00	CB(BT-1)	GP	0.21				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0903
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0911
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.19				-	-
	mg/kg	11/20/2000	0002	6.00 - 6.00	CB(BT-1)	GP	0.38				-	-
Lead	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	8.45				-	-
	mg/kg	11/20/2000	0002	6.00 - 6.00	CB(BT-1)	GP	6.62				-	-
Molybdenum	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.08	U			0.08	-
	mg/kg	11/20/2000	0002	6.00 - 6.00	CB(BT-1)	GP	0.08	U			0.08	-
Selenium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.35	U			0.35	-
	mg/kg	11/20/2000	0002	6.00 - 6.00	CB(BT-1)	GP	0.39	B			-	-
Uranium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.41				-	-
	mg/kg	11/20/2000	0002	6.00 - 6.00	CB(BT-1)	GP	0.9				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0911
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0912
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	3.39				-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	1.79				-	-
Lead	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	5.21				-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	5.96				-	-
Molybdenum	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.23	B			-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.31	B			-	-
Selenium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	1.51				-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	1.5				-	-
Uranium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	2.3				-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	2.09				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0912
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0913
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	1.31				-	-
	mg/kg	11/20/2000	0002	3.50 - 3.50	CB(BT-1)	SS	0.081	B			-	-
Lead	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	12.6				-	-
	mg/kg	11/20/2000	0002	3.50 - 3.50	CB(BT-1)	SS	6.14				-	-
Molybdenum	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.093	B			-	-
	mg/kg	11/20/2000	0002	3.50 - 3.50	CB(BT-1)	SS	0.33	B			-	-
Selenium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	1.00				-	-
	mg/kg	11/20/2000	0002	3.50 - 3.50	CB(BT-1)	SS	0.53				-	-
Uranium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	2.03				-	-
	mg/kg	11/20/2000	0002	3.50 - 3.50	CB(BT-1)	SS	0.29				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0913
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1)	ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0914
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	13.4				-	-
	mg/kg	11/20/2000	0002	3.00 - 3.00	CB(BT-1)	SH	0.21				-	-
Lead	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	7.63				-	-
	mg/kg	11/20/2000	0002	3.00 - 3.00	CB(BT-1)	SH	13.6				-	-
Molybdenum	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.08	U			0.08	-
	mg/kg	11/20/2000	0002	3.00 - 3.00	CB(BT-1)	SH	0.39	B			-	-
Selenium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	2.77				-	-
	mg/kg	11/20/2000	0002	3.00 - 3.00	CB(BT-1)	SH	0.89				-	-
Uranium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	15.1				-	-
	mg/kg	11/20/2000	0002	3.00 - 3.00	CB(BT-1)	SH	0.61				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0914
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0924
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.84				-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GM	2.03				-	-
Lead	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	10.7				-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GM	9.34				-	-
Molybdenum	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.096	B			-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GM	0.12	B			-	-
Selenium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.66				-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GM	1.19				-	-
Uranium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	2.05				-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GM	6.5				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0924
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1)	ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0925
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.42				-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.60				-	-
Lead	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	10.6				-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	9.95				-	-
Molybdenum	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.18	B			-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.15	B			-	-
Selenium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	1.1				-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	0.47	B			-	-
Uranium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	1.27				-	-
	mg/kg	11/20/2000	0002	5.00 - 5.00	CB(BT-1)	GM	1.17				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0925
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1)	ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0926
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	7.85				-	-
	mg/kg	11/20/2000	0002	4.00 - 4.00	CB(BT-1)	GM	6.98				-	-
Lead	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	5.96				-	-
	mg/kg	11/20/2000	0002	4.00 - 4.00	CB(BT-1)	GM	7.71				-	-
Molybdenum	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	0.11	B			-	-
	mg/kg	11/20/2000	0002	4.00 - 4.00	CB(BT-1)	GM	0.16	B			-	-
Selenium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	1.22				-	-
	mg/kg	11/20/2000	0002	4.00 - 4.00	CB(BT-1)	GM	1.16				-	-
Uranium	mg/kg	11/20/2000	0001	2.00 - 2.00	CB(BT-1)	GM	19.5				-	-
	mg/kg	11/20/2000	0002	4.00 - 4.00	CB(BT-1)	GM	4.6				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0926
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0927
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Cadmium	mg/kg	11/20/2000	0001	3.00 - 3.00	CB(BT-1)	SM	0.51				-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GP	0.74				-	-
Lead	mg/kg	11/20/2000	0001	3.00 - 3.00	CB(BT-1)	SM	6.46				-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GP	7.16				-	-
Molybdenum	mg/kg	11/20/2000	0001	3.00 - 3.00	CB(BT-1)	SM	0.08	U			0.08	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GP	0.08	U			0.08	-
Selenium	mg/kg	11/20/2000	0001	3.00 - 3.00	CB(BT-1)	SM	0.59				-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GP	0.52				-	-
Uranium	mg/kg	11/20/2000	0001	3.00 - 3.00	CB(BT-1)	SM	6.07				-	-
	mg/kg	11/20/2000	0002	5.00 - 6.00	CB(BT-1)	GP	4.79				-	-

SOIL CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0927
REPORT DATE: 12/12/2001 10:43 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

CB(BT-1) ESL Standard Batch Leaching

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

GM	SILTY GRAVELS	GP	GRAVEL	SH	SHALE
SM	SILTY SANDS	SS	SANDSTONE		

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Table I-3. Mill Tailings Area (DUR01) Sediment

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0506
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	01/30/2001	0001	0.00 - 0.00			7			#	0.15	-
Cadmium	mg/kg	01/30/2001	0001	0.00 - 0.00			0.61			#	0.03	-
Iron	mg/kg	01/30/2001	0001	0.00 - 0.00			15000	*	J	#	1.1	-
Lead	mg/kg	01/30/2001	0001	0.00 - 0.00			14.8	*	J	#	0.01	-
Manganese	mg/kg	01/30/2001	0001	0.00 - 0.00			143	*	J	#	0.3	-
Mercury	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	01/30/2001	0001	0.00 - 0.00			3	N	J	#	0.08	-
Nitrate as NO3	mg/kg	01/30/2001	0001	0.00 - 0.00			0.69	U		#	0.687	-
Selenium	mg/kg	01/30/2001	0001	0.00 - 0.00			1.5			#	0.35	-
Sulfate	mg/kg	01/30/2001	0001	0.00 - 0.00			130			#	0.589	-
Uranium	mg/kg	01/30/2001	0001	0.00 - 0.00			0.93	*	J	#	0.01	-
Zinc	mg/kg	01/30/2001	0001	0.00 - 0.00			57.2			#	1.02	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0506
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0515
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	01/30/2001	0001	0.00 - 0.00			8.7			#	0.15	-
Cadmium	mg/kg	01/30/2001	0001	0.00 - 0.00			1.2			#	0.03	-
Iron	mg/kg	01/30/2001	0001	0.00 - 0.00			14900	*	J	#	1.1	-
Lead	mg/kg	01/30/2001	0001	0.00 - 0.00			368	*	J	#	6.25	-
Manganese	mg/kg	01/30/2001	0001	0.00 - 0.00			821	*	J	#	0.3	-
Mercury	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	01/30/2001	0001	0.00 - 0.00			2.9	N	J	#	0.08	-
Nitrate as NO3	mg/kg	01/30/2001	0001	0.00 - 0.00			0.69	U		#	0.687	-
Selenium	mg/kg	01/30/2001	0001	0.00 - 0.00			1.7			#	0.35	-
Sulfate	mg/kg	01/30/2001	0001	0.00 - 0.00			177			#	0.589	-
Uranium	mg/kg	01/30/2001	0001	0.00 - 0.00			0.93	*	J	#	0.01	-
Zinc	mg/kg	01/30/2001	0001	0.00 - 0.00			580			#	1.02	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0515
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0583
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	01/31/2001	0001	0.00 - 0.00			7.4			#	0.15	-
Cadmium	mg/kg	01/31/2001	0001	0.00 - 0.00			2			#	0.03	-
Iron	mg/kg	01/31/2001	0001	0.00 - 0.00			14700	*	J	#	1.1	-
Lead	mg/kg	01/31/2001	0001	0.00 - 0.00			155	*	J	#	0.25	-
Manganese	mg/kg	01/31/2001	0001	0.00 - 0.00			802	*	J	#	0.3	-
Mercury	mg/kg	01/31/2001	0001	0.00 - 0.00			0.039	B		#	0.02	-
Molybdenum	mg/kg	01/31/2001	0001	0.00 - 0.00			1.9	N	J	#	0.08	-
Nitrate as NO3	mg/kg	01/31/2001	0001	0.00 - 0.00			0.69	U		#	0.687	-
Selenium	mg/kg	01/31/2001	0001	0.00 - 0.00			1.6			#	0.35	-
Sulfate	mg/kg	01/31/2001	0001	0.00 - 0.00			18.6			#	0.589	-
Uranium	mg/kg	01/31/2001	0001	0.00 - 0.00			3	*	J	#	0.01	-
Zinc	mg/kg	01/31/2001	0001	0.00 - 0.00			451			#	1.02	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0583
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0584
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	01/31/2001	0001	0.00 - 0.00			9.7			#	0.15	-
Cadmium	mg/kg	01/31/2001	0001	0.00 - 0.00			2.9			#	0.03	-
Iron	mg/kg	01/31/2001	0001	0.00 - 0.00			16000	*	J	#	1.1	-
Lead	mg/kg	01/31/2001	0001	0.00 - 0.00			307	*	J	#	0.25	-
Manganese	mg/kg	01/31/2001	0001	0.00 - 0.00			1460	*	J	#	0.3	-
Mercury	mg/kg	01/31/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	01/31/2001	0001	0.00 - 0.00			3.4	N	J	#	0.08	-
Nitrate as NO3	mg/kg	01/31/2001	0001	0.00 - 0.00			0.69	U		#	0.687	-
Selenium	mg/kg	01/31/2001	0001	0.00 - 0.00			1.3			#	0.35	-
Sulfate	mg/kg	01/31/2001	0001	0.00 - 0.00			57.5			#	0.589	-
Uranium	mg/kg	01/31/2001	0001	0.00 - 0.00			1.6	*	J	#	0.01	-
Zinc	mg/kg	01/31/2001	0001	0.00 - 0.00			1340			#	25.5	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0584
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0586
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	01/31/2001	0001	0.00 - 0.00			6.5			#	0.15	-
Cadmium	mg/kg	01/31/2001	0001	0.00 - 0.00			2.3			#	0.03	-
Iron	mg/kg	01/31/2001	0001	0.00 - 0.00			13200	*	J	#	1.1	-
Lead	mg/kg	01/31/2001	0001	0.00 - 0.00			177	*	J	#	0.25	-
Manganese	mg/kg	01/31/2001	0001	0.00 - 0.00			1740	*	J	#	0.3	-
Mercury	mg/kg	01/31/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	01/31/2001	0001	0.00 - 0.00			3	N	J	#	0.08	-
Nitrate as NO3	mg/kg	01/31/2001	0001	0.00 - 0.00			8	B		#	0.687	-
Selenium	mg/kg	01/31/2001	0001	0.00 - 0.00			1.6			#	0.35	-
Sulfate	mg/kg	01/31/2001	0001	0.00 - 0.00			84			#	0.589	-
Uranium	mg/kg	01/31/2001	0001	0.00 - 0.00			0.81	*	J	#	0.01	-
Zinc	mg/kg	01/31/2001	0001	0.00 - 0.00			530			#	1.02	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0586
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0650 SURFACE WATER AND SED.
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/09/1993	0002	0.00 - 0.00			9.5	S		#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			6.1			#	0.15	-
Cadmium	mg/kg	11/09/1993	0002	0.00 - 0.00			1.4	S*		#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.64			#	0.03	-
Iron	mg/kg	11/09/1993	0002	0.00 - 0.00			22100	N		#	3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			13900	*	J	#	1.1	-
Lead	mg/kg	11/09/1993	0002	0.00 - 0.00			23.8	*		#	0.3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			15.4	*	J	#	0.01	-
Manganese	mg/kg	11/09/1993	0002	0.00 - 0.00			215			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			163	*	J	#	0.3	-
Mercury	mg/kg	11/09/1993	0002	0.00 - 0.00			0.10	U		#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	11/09/1993	0002	0.00 - 0.00			3			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			2.8	N	J	#	0.08	-
Nitrate as NO3	mg/kg	11/09/1993	0002	0.00 - 0.00			1.0	U	J	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.69	U		#	0.687	-
Percent Solids	%	11/09/1993	0002	0.00 - 0.00			64.3			#	0.1	-
Selenium	mg/kg	11/09/1993	0002	0.00 - 0.00			1.6			#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			2.2			#	0.35	-
Sulfate	mg/kg	11/09/1993	0002	0.00 - 0.00			61.3			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			160			#	0.589	-
Uranium	mg/kg	11/09/1993	0002	0.00 - 0.00			1.5			#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.92	*	J	#	0.01	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0650 SURFACE WATER AND SED.
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/kg	11/09/1993	0002	0.00 - 0.00			134			#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			59.7			#	1.02	-

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.
- J Estimated

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0651 SURFACE WATER AND SED.
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/09/1993	0002	0.00 - 0.00			8.8			#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			6			#	0.15	-
Cadmium	mg/kg	11/09/1993	0002	0.00 - 0.00			0.7	*		#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			1.2			#	0.03	-
Iron	mg/kg	11/09/1993	0002	0.00 - 0.00			19800	N		#	3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			14700	*	J	#	1.1	-
Lead	mg/kg	11/09/1993	0002	0.00 - 0.00			14.7	*		#	0.3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			83.7	*	J	#	0.01	-
Manganese	mg/kg	11/09/1993	0002	0.00 - 0.00			229			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			488	*	J	#	0.3	-
Mercury	mg/kg	11/09/1993	0002	0.00 - 0.00			0.10	U		#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	11/09/1993	0002	0.00 - 0.00			2			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			2.2	N	J	#	0.08	-
Nitrate as NO3	mg/kg	11/09/1993	0002	0.00 - 0.00			1.0	U	J	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.78	B		#	0.687	-
Percent Solids	%	11/09/1993	0002	0.00 - 0.00			60.8			#	0.1	-
Selenium	mg/kg	11/09/1993	0002	0.00 - 0.00			1.6			#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.97			#	0.35	-
Sulfate	mg/kg	11/09/1993	0002	0.00 - 0.00			69.6			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			68.7			#	0.589	-
Uranium	mg/kg	11/09/1993	0002	0.00 - 0.00			1.4			#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.88	*	J	#	0.01	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0651 SURFACE WATER AND SED.
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/kg	11/09/1993	0002	0.00 - 0.00			82.5		J	#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			281			#	1.02	-

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0652 SURFACE WATER AND SED.
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/10/1993	0002	0.00 - 0.00			12.0	+		#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			8.9			#	0.15	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			7.7			#	0.15	-
Cadmium	mg/kg	11/10/1993	0002	0.00 - 0.00			9.0	S*		#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			2.1			#	0.03	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			2.1			#	0.03	-
Iron	mg/kg	11/10/1993	0002	0.00 - 0.00			16300	N		#	3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			15700	*	J	#	1.1	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			14300	*	J	#	1.1	-
Lead	mg/kg	11/10/1993	0002	0.00 - 0.00			152	S*		#	0.3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			222	*	J	#	0.25	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			215	*	J	#	0.25	-
Manganese	mg/kg	11/10/1993	0002	0.00 - 0.00			1520			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			1700	*	J	#	0.3	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			1590	*	J	#	0.3	-
Mercury	mg/kg	11/10/1993	0002	0.00 - 0.00			0.10	U		#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	11/10/1993	0002	0.00 - 0.00			7			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			3.4	N	J	#	0.08	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			2.8	N	J	#	0.08	-
Nitrate as NO3	mg/kg	11/10/1993	0002	0.00 - 0.00			1.0	U	J	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			41.5			#	0.687	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			41.2			#	0.687	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0652 SURFACE WATER AND SED.
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Percent Solids	%	11/10/1993	0002	0.00 - 0.00			54.3			#	0.1	-
Selenium	mg/kg	11/10/1993	0002	0.00 - 0.00			1.2	S		#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.95			#	0.35	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			1.6			#	0.35	-
Sulfate	mg/kg	11/10/1993	0002	0.00 - 0.00			204			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			629			#	0.589	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			600			#	0.589	-
Uranium	mg/kg	11/10/1993	0002	0.00 - 0.00			3.2			#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.93	*	J	#	0.01	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			0.87	*	J	#	0.01	-
Zinc	mg/kg	11/10/1993	0002	0.00 - 0.00			443			#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			658			#	1.02	-
	mg/kg	01/30/2001	0002	0.00 - 0.00			642			#	1.02	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0652 SURFACE WATER AND SED.
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0690
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/10/1993	0002	0.00 - 0.00			9.7	S		#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			6.5			#	0.15	-
Cadmium	mg/kg	11/10/1993	0002	0.00 - 0.00			1.2	*		#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.57			#	0.03	-
Iron	mg/kg	11/10/1993	0002	0.00 - 0.00			17000	N		#	3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			14600	*	J	#	1.1	-
Lead	mg/kg	11/10/1993	0002	0.00 - 0.00			26.3	*		#	0.3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			16.3	*	J	#	0.01	-
Manganese	mg/kg	11/10/1993	0002	0.00 - 0.00			231			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			153	*	J	#	0.3	-
Mercury	mg/kg	11/10/1993	0002	0.00 - 0.00			0.10	U		#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	11/10/1993	0002	0.00 - 0.00			3			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			2.7	N	J	#	0.08	-
Nitrate as NO3	mg/kg	11/10/1993	0002	0.00 - 0.00			1.0	U	J	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.69	U		#	0.687	-
Percent Solids	%	11/10/1993	0002	0.00 - 0.00			56.4			#	0.1	-
Selenium	mg/kg	11/10/1993	0002	0.00 - 0.00			1.6			#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			2.2			#	0.35	-
Sulfate	mg/kg	11/10/1993	0002	0.00 - 0.00			69.5			#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			88.5			#	0.589	-
Uranium	mg/kg	11/10/1993	0002	0.00 - 0.00			1.5			#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.89	*	J	#	0.01	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0690
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/kg	11/10/1993	0002	0.00 - 0.00			99.9		J	#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			62.3			#	1.02	-

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0691
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/10/1993	0003	0.00 - 0.00			14.1	S		#	0.5	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			8.6			#	0.5	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			16.9			#	0.15	-
Cadmium	mg/kg	11/10/1993	0003	0.00 - 0.00			1.8	*		#	0.1	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			1.8	*		#	0.1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			209			#	0.75	-
Iron	mg/kg	11/10/1993	0003	0.00 - 0.00			17300	N		#	3	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			16600	N		#	3	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			44700	*	J	#	1.1	-
Lead	mg/kg	11/10/1993	0003	0.00 - 0.00			39.6	*		#	0.3	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			63.9	*		#	0.3	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			2650	*	J	#	100	-
Manganese	mg/kg	11/10/1993	0003	0.00 - 0.00			569			#	1	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			601			#	1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			4950	*	J	#	7.5	-
Mercury	mg/kg	11/10/1993	0003	0.00 - 0.00			0.10	U		#	0.1	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			0.10	U		#	0.1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			0.053			#	0.02	-
Molybdenum	mg/kg	11/10/1993	0003	0.00 - 0.00			2			#	1	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			3			#	1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			33.6	N	J	#	0.08	-
Nitrate as NO3	mg/kg	11/10/1993	0003	0.00 - 0.00			1.0	U	J	#	1	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			1.0	U	J	#	1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			3.3	B		#	0.687	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0691
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Percent Solids	%	11/10/1993	0003	0.00 - 0.00			62.5			#	0.1	-
	%	11/10/1993	0004	0.00 - 0.00			60.8			#	0.1	-
Selenium	mg/kg	11/10/1993	0003	0.00 - 0.00			1.9			#	0.5	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			1.3			#	0.5	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			4.2			#	0.35	-
Sulfate	mg/kg	11/10/1993	0003	0.00 - 0.00			57.6			#	1	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			60.4			#	1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			26.1			#	0.589	-
Uranium	mg/kg	11/10/1993	0003	0.00 - 0.00			1.6			#	0.1	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			1.2			#	0.1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			9	*	J	#	0.01	-
Zinc	mg/kg	11/10/1993	0003	0.00 - 0.00			241			#	0.5	-
	mg/kg	11/10/1993	0004	0.00 - 0.00			267			#	0.5	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			22000			#	2550	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR01, DURANGO MILL TAILINGS
LOCATION: 0691
REPORT DATE: 12/12/2001 8:22 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Table I-4. Raffinate Ponds Area (DUR02) Sediment

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0587
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	01/30/2001	0001	0.00 - 0.00			8			#	0.15	-
Cadmium	mg/kg	01/30/2001	0001	0.00 - 0.00			1.2			#	0.03	-
Iron	mg/kg	01/30/2001	0001	0.00 - 0.00			10200	*	J	#	1.1	-
Lead	mg/kg	01/30/2001	0001	0.00 - 0.00			51.4	*	J	#	0.01	-
Manganese	mg/kg	01/30/2001	0001	0.00 - 0.00			303	*	J	#	0.3	-
Mercury	mg/kg	01/30/2001	0001	0.00 - 0.00			0.063			#	0.02	-
Molybdenum	mg/kg	01/30/2001	0001	0.00 - 0.00			0.47	BN	UJ	#	0.08	-
Nitrate as NO3	mg/kg	01/30/2001	0001	0.00 - 0.00			11.9			#	0.687	-
Selenium	mg/kg	01/30/2001	0001	0.00 - 0.00			1.1			#	0.35	-
Sulfate	mg/kg	01/30/2001	0001	0.00 - 0.00			645			#	0.589	-
Uranium	mg/kg	01/30/2001	0001	0.00 - 0.00			1.3	*	J	#	0.01	-
Zinc	mg/kg	01/30/2001	0001	0.00 - 0.00			67.8			#	1.02	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0587
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0588
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	01/30/2001	0001	0.00 - 0.00			12.2			#	0.15	-
Cadmium	mg/kg	01/30/2001	0001	0.00 - 0.00			1.4			#	0.03	-
Iron	mg/kg	01/30/2001	0001	0.00 - 0.00			9830	*	J	#	1.1	-
Lead	mg/kg	01/30/2001	0001	0.00 - 0.00			53.1	*	J	#	0.01	-
Manganese	mg/kg	01/30/2001	0001	0.00 - 0.00			151	*	J	#	0.3	-
Mercury	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	01/30/2001	0001	0.00 - 0.00			0.48	BN	UJ	#	0.08	-
Nitrate as NO3	mg/kg	01/30/2001	0001	0.00 - 0.00			2.7	B		#	0.687	-
Selenium	mg/kg	01/30/2001	0001	0.00 - 0.00			0.41	B		#	0.35	-
Sulfate	mg/kg	01/30/2001	0001	0.00 - 0.00			13400			#	2.356	-
Uranium	mg/kg	01/30/2001	0001	0.00 - 0.00			4.5	*	J	#	0.01	-
Zinc	mg/kg	01/30/2001	0001	0.00 - 0.00			56.6			#	1.02	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0588
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0654 RESERVED FOR CDAY
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/09/1993	0002	0.00 - 0.00			31.2		RX	#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			7.7			#	0.15	-
Cadmium	mg/kg	11/09/1993	0002	0.00 - 0.00			3.2	*	RX	#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			1.4			#	0.03	-
Iron	mg/kg	11/09/1993	0002	0.00 - 0.00			32800	N	RX	#	3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			14100	*	J	#	1.1	-
Lead	mg/kg	11/09/1993	0002	0.00 - 0.00			106	*	RX	#	0.3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			171	*	J	#	0.25	-
Manganese	mg/kg	11/09/1993	0002	0.00 - 0.00			736		RX	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			895	*	J	#	0.3	-
Mercury	mg/kg	11/09/1993	0002	0.00 - 0.00			0.10	U	RX	#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	11/09/1993	0002	0.00 - 0.00			1	U	RX	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			2	N	J	#	0.08	-
Nitrate as NO3	mg/kg	11/09/1993	0002	0.00 - 0.00			2.3		RXJ	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.69	U		#	0.687	-
Percent Solids	%	11/09/1993	0002	0.00 - 0.00			63.3		RX	#	0.1	-
Selenium	mg/kg	11/09/1993	0002	0.00 - 0.00			0.6	W	RX	#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			1.2			#	0.35	-
Sulfate	mg/kg	11/09/1993	0002	0.00 - 0.00			196		RX	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			127			#	0.589	-
Uranium	mg/kg	11/09/1993	0002	0.00 - 0.00			1.8		RX	#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.9	*	J	#	0.01	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0654 RESERVED FOR CDAY
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/kg	11/09/1993	0002	0.00 - 0.00			210		RX	#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			489			#	1.02	-

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.
- J Estimated

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0655 RESERVED FOR CDAY
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/10/1993	0002	0.00 - 0.00			8.1		RX	#	0.5	-
Cadmium	mg/kg	11/10/1993	0002	0.00 - 0.00			1.1	S*	RX	#	0.1	-
Iron	mg/kg	11/10/1993	0002	0.00 - 0.00			13500	N	RX	#	3	-
Lead	mg/kg	11/10/1993	0002	0.00 - 0.00			25.8	S*	RX	#	0.3	-
Manganese	mg/kg	11/10/1993	0002	0.00 - 0.00			486		RX	#	1	-
Mercury	mg/kg	11/10/1993	0002	0.00 - 0.00			0.10	U	RX	#	0.1	-
Molybdenum	mg/kg	11/10/1993	0002	0.00 - 0.00			8		RX	#	1	-
Nitrate as NO3	mg/kg	11/10/1993	0002	0.00 - 0.00			1.5		RXJ	#	1	-
Percent Solids	%	11/10/1993	0002	0.00 - 0.00			65.9		RX	#	0.1	-
Selenium	mg/kg	11/10/1993	0002	0.00 - 0.00			0.5	US	RX	#	0.5	-
Sulfate	mg/kg	11/10/1993	0002	0.00 - 0.00			6920	I	RX	#	38	-
Uranium	mg/kg	11/10/1993	0002	0.00 - 0.00			2.4		RX	#	0.1	-
Zinc	mg/kg	11/10/1993	0002	0.00 - 0.00			54.7		RXJ	#	0.5	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0655 RESERVED FOR CDAY
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0656 RESERVED FOR CDAY
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/10/1993	0002	0.00 - 0.00			12.1		RX	#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			7.5			#	0.15	-
Cadmium	mg/kg	11/10/1993	0002	0.00 - 0.00			3.6	*	RX	#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			1.9			#	0.03	-
Iron	mg/kg	11/10/1993	0002	0.00 - 0.00			25300	N	RX	#	3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			13200	*	J	#	1.1	-
Lead	mg/kg	11/10/1993	0002	0.00 - 0.00			159	*	RX	#	0.3	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			198	*	J	#	0.25	-
Manganese	mg/kg	11/10/1993	0002	0.00 - 0.00			1200		RX	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			1440	*	J	#	0.3	-
Mercury	mg/kg	11/10/1993	0002	0.00 - 0.00			0.10	U	RX	#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	11/10/1993	0002	0.00 - 0.00			4		RX	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			2.4	N	J	#	0.08	-
Nitrate as NO3	mg/kg	11/10/1993	0002	0.00 - 0.00			1.0	U	RXJ	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.69	U		#	0.687	-
Percent Solids	%	11/10/1993	0002	0.00 - 0.00			49.9		RX	#	0.1	-
Selenium	mg/kg	11/10/1993	0002	0.00 - 0.00			1.0		RX	#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.73			#	0.35	-
Sulfate	mg/kg	11/10/1993	0002	0.00 - 0.00			14.2		RXJ	#	1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			81.5			#	0.589	-
Uranium	mg/kg	11/10/1993	0002	0.00 - 0.00			2.3		RX	#	0.1	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			0.85	*	J	#	0.01	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0656 RESERVED FOR CDAY
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/kg	11/10/1993	0002	0.00 - 0.00			702		RX	#	0.5	-
	mg/kg	01/30/2001	0001	0.00 - 0.00			552			#	1.02	-

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0657 RESERVED FOR CDAY
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Arsenic	mg/kg	11/10/1993	0002	0.00 - 0.00			11.9		RX	#	0.5	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			8.3			#	0.15	-
Cadmium	mg/kg	11/10/1993	0002	0.00 - 0.00			4.0	S*	RX	#	0.1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			1.7			#	0.03	-
Iron	mg/kg	11/10/1993	0002	0.00 - 0.00			16500	N	RX	#	3	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			14500	*	J	#	1.1	-
Lead	mg/kg	11/10/1993	0002	0.00 - 0.00			75.6	*	RX	#	0.3	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			157	*	J	#	0.25	-
Manganese	mg/kg	11/10/1993	0002	0.00 - 0.00			825		RX	#	1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			1070	*	J	#	0.3	-
Mercury	mg/kg	11/10/1993	0002	0.00 - 0.00			0.10	U	RX	#	0.1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			0.02	U		#	0.02	-
Molybdenum	mg/kg	11/10/1993	0002	0.00 - 0.00			1	U	RX	#	1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			1.6	N	J	#	0.08	-
Nitrate as NO3	mg/kg	11/10/1993	0002	0.00 - 0.00			1.0	U	RXJ	#	1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			1.7	B		#	0.687	-
Percent Solids	%	11/10/1993	0002	0.00 - 0.00			60.7		RX	#	0.1	-
Selenium	mg/kg	11/10/1993	0002	0.00 - 0.00			0.7	W	RX	#	0.5	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			1			#	0.35	-
Sulfate	mg/kg	11/10/1993	0002	0.00 - 0.00			53.7		RX	#	1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			68			#	0.589	-
Uranium	mg/kg	11/10/1993	0002	0.00 - 0.00			1.7		RX	#	0.1	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			0.98	*	J	#	0.01	-

SEDIMENT CHEMISTRY DATA BY LOCATION FOR SITE DUR02, DURANGO RAFFINATE PONDS
LOCATION: 0657 RESERVED FOR CDAY
REPORT DATE: 12/12/2001 8:20 am

PARAMETER	UNITS	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	DIGEST. CODE	SAMP DESC.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Zinc	mg/kg	11/10/1993	0002	0.00 - 0.00			254		RX	#	0.5	-
	mg/kg	01/31/2001	0001	0.00 - 0.00			435			#	1.02	-

DIGESTION CODES:

SAMPLE DESCRIPTORS (UNIFIED SOIL CLASSIFICATION SYSTEM):

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
+	Correlation coefficient for MSA < 0.995.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
Z	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
C	Pesticide result confirmed by GC-MS.
M	GFAA duplicate injection precision not met.
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compund (TIC).
S	Result determined by method of standard addition (MSA).
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
D	Analyte determined in diluted sample.
P	> 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
X	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
Y	Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
>	Result above upper detection limit.
J	Estimated

DATA QUALIFIERS:

J	Estimated value.	F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
L	Less than 3 bore volumes purged prior to sampling.	R	Unusable result.	X	Location is undefined.
U	Parameter analyzed for but was not detected.				

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

Appendix J

ESL Subpile Soils Report

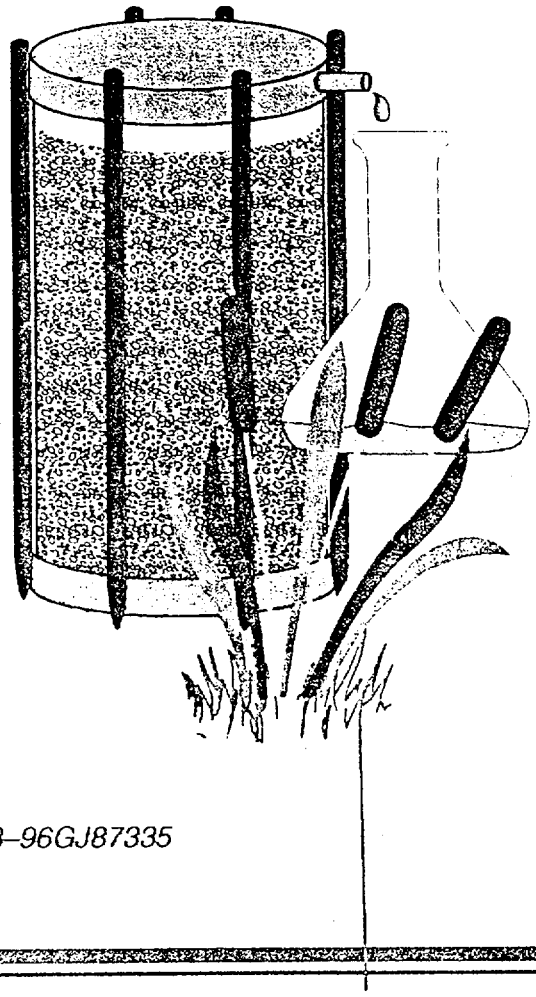
GJO–2001–236–TAR
ESL–RPT–2001–06

Environmental Sciences Laboratory

Contaminants in Subpile Soils

UMTRA Ground Water Project
Durango, Colorado, Site

July 2001



Prepared for
U.S. Department of Energy
Grand Junction Office
Grand Junction, Colorado

Work Performed Under DOE Contract No. DE–AC13–96GJ87335
DOE Task Order No. MAC01–05

Contaminants in Subpile Soils

UMTRA Ground Water Project, Durango, Colorado, Site

July 2001

Prepared for
U.S. Department of Energy
Grand Junction Office
Grand Junction, Colorado

Project Number UGW–511–0006–03–000
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Signature Page

Contaminants in Subpile Soils

UMTRA Ground Water Project
Durango, Colorado, Site

July 2001

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Acronyms

DOE	U.S. Department of Energy
ESL	Environmental Sciences Laboratory
ft	feet
GJO	Grand Junction Office
HNO_3	nitric acid
mg/kg	milligrams per kilogram
mL	milliliter(s)
mm	millimeters(s)
rpm	revolutions per minute
UMTRA	Uranium Mill Tailings Remedial Action (Project)

End of current text

Executive Summary

This study was undertaken to determine if cadmium, lead, molybdenum, selenium, and/or uranium are present in soils in sufficient concentrations to cause continuing contamination to the ground water at the Uranium Mill Tailings Remedial Action Ground Water Project Durango, Colorado, site. Remedial action criteria for soil excavation and removal was based on a radiometric standard for Radium-226 and details about the original distribution (lateral and horizontal) and the amount of these contaminants in the subpile soils is not known.

The site consists of two proximate, hydrogeologically separate areas: the mill tailings area and raffinate ponds area. A total of nineteen samples, including 3 background samples, were collected from the mill tailings area from 11 locations. A total of twenty samples, including 4 background samples, were collected from the raffinate ponds area from 9 locations. Samples were digested in 5 percent nitric acid (HNO_3) and submitted for cadmium, lead, molybdenum, selenium, and uranium analysis.

In the mill tailings area, sample 0918 at 5 ft, which contains lead smelter slag, has the highest lead, molybdenum, and uranium concentrations. Excluding this sample, the highest constituent concentrations are 7.20 milligrams per kilogram (mg/kg) cadmium, 141 mg/kg lead, 2.18 mg/kg molybdenum, 1.31 mg/kg selenium, and 21.8 mg/kg uranium. The highest background constituent concentrations are 1.27 mg/kg cadmium, 141 mg/kg lead, 0.66 mg/kg molybdenum, 0.88 mg/kg selenium, and 1.22 mg/kg uranium.

In the raffinate ponds area, the highest constituent concentrations are 13.4 mg/kg cadmium, 13.6 mg/kg lead, 0.39 mg/kg molybdenum, 2.77 mg/kg selenium, and 19.5 mg/kg uranium. The highest background concentrations are 2.17 mg/kg cadmium, 10.0 mg/kg lead, 0.13 mg/kg molybdenum, 0.35 mg/kg selenium, and 0.29 mg/kg uranium.

Uranium and cadmium concentrations of subpile samples are higher than the concentrations in background samples. This may indicate that mill processing altered the chemical composition of the soil. Concentrations of lead, molybdenum, and selenium in background samples suggest that these constituents naturally occur within the area at concentrations above their crustal mean concentrations. Overall, constituent concentrations do not appear to be sufficient to be a source of continuing ground water contamination.

End of current text

1.0 Introduction

The Durango, Colorado, Uranium Mill Tailings Remedial Action (UMTRA) Project site is located on the west bank of the Animas River outside the city limits about 0.25 miles from the central business district of Durango (Figure 1). This site contains two hydrogeologically separate areas: the mill tailings area and the raffinate ponds area.

In 1991, surface remedial action was completed. Tailings piles, mill debris, and contaminated soils from both areas were relocated to the nearby Bodo Canyon disposal site. After relocation, the mill tailings area and the raffinate ponds area were contoured and planted with grasses. In this study, "soil" is defined as the unconsolidated material above the bedrock regardless of genesis.

The purpose of this report is to show soil sample locations, describe the methods used, and provide the results of laboratory analyses. Samples were collected September 25, 2000 and November 18–20, 2000. In January 2001, the samples were acid leached in the Environmental Sciences Laboratory (ESL). Thirty-nine soil samples were analyzed. Nineteen samples at 11 locations were obtained from the mill tailings area, including 3 background samples (Figure 2). Twenty samples at 9 locations were collected from the raffinate ponds area, including four background samples (Figure 3). Appendix A contains the ESL work submittal for this project, Appendix B contains copies of the ESL notes and field notes, and Appendix C contains an abbreviated set of the data submitted for inclusion in the SEEPro database.

The ESL was established in 1991 to provide support to programs at the DOE Grand Junction Office. The geochemical laboratories are equipped with bench space and equipment to conduct research, treatability studies, and pilot-scale tests to supplement numerical modeling efforts and to evaluate promising remediation technologies. The ESL also maintains an ecology laboratory equipped to conduct testing to design and evaluate landfill covers and phytoremediation technologies, and operates a mobile laboratory that is routinely used for expedited site characterization at field sites.

End of current text

2.0 Sample Locations

The goal of this study was to determine if residual contaminants were left on site and if they provide a continuing source of contamination to ground water. Soil samples were selected from site locations most likely to have contaminated subpile soils and were collected from beneath the former tailings piles and raffinate ponds.

In the mill tailings area, a total of 19 soil samples were collected from 11 locations (Figure 2). Three background samples were collected north along the Animas River (sample 0930) and upgradient to the northeast along Lightner Creek (samples 0931 and 0932). In the raffinate ponds area, a total of 20 samples were collected from 9 locations (Figure 3). Four background samples were collected from location 0903 at depths ranging from 4 to 28 feet (ft) below the surface.

End of current text

3.0 Background

3.1 Site Conditions

DOE began relocating the tailings piles, mill debris, and contaminated soil from the mill tailings area and raffinate ponds area to the Bodo Canyon disposal site in November 1986; remedial action was completed in May 1991. After tailings piles and contaminated soil were removed the remaining surficial material was mixed and spread over both areas. This "fill" is a mixture of clayey sands, gravels, and cobbles. Both areas were contoured and planted with grasses.

Supplemental standards in the mill tailings area were applied to contamination left in place in two regions along the banks of the Animas River, and to unreachable areas of windblown contamination on the slope of Smelter Mountain (Figure 2). In the raffinate ponds area, supplemental standards were applied to thorium-230 soil (Figure 3).

3.2 Site Geology and Hydrology

The Durango UMTRA site is located on the west bank of the Animas River outside the city limits and contains two hydrogeologically separate areas: the mill tailings area and the raffinate ponds area (Figure 1). Each area will be described separately. Both areas have common stratigraphic units. The characteristics of each unit will be provided before discussing the particular geology of each area.

3.2.1 General Geology

Three surficial units are present at the Durango site and the most recent is the fill material used for contouring and planting grasses after surface remediation was completed. Before site remediation, unconsolidated surficial deposits in the raffinate ponds area consisted of colluvium from the slope of Smelter Mountain, glacial outwash, and recent river alluvium. The surficial deposits were 20 to 30 ft thick in the area of the ponds. As much as 20 ft of surficial deposits were removed during site remediation. Most of the remaining surficial material was mixed during remediation activities and now is a mixture of clayey sands, gravels, and cobbles. Some gravel beds overlying the bedrock remain. In addition to mixed colluvium and alluvium, surface material collected during excavation of the Bodo Canyon disposal site was added to the mixture.

Colluvium collects along the base of Smelter Mountain. Near the Animas River and below the colluvium is alluvial material. Generally, these geologically recent surficial units are a mixture of silt, sand, gravel, and cobbles. The colluvium is poorly sorted, silty soil from Smelter Mountain that contains angular gravel and cobble sized rock fragments. It can be difficult to distinguish fill material from colluvium. Alluvial river deposits, which may also be glacial outwash, consist of well-sorted sands and sub-rounded to rounded gravel and cobbles.

Beneath the unconsolidated surficial deposits are two members of the Mesaverde Group of Cretaceous age. The younger unit is the Menefee Formation and the older is the Point Lookout Sandstone. Below the Point Lookout Sandstone is the Mancos Shale.

The Menefee Formation consists of massive sandstone and shale with beds of carbonaceous shale and coal. The Point Lookout Sandstone is the basal formation of the Mesaverde Group divided into two members: a lower transitional member containing interbedded lenticular sandstone and shales, and an upper massive sandstone member. The Point Lookout Sandstone consists of siltstone with interbedded sandstone and minor amounts of shale and crops out on the slopes and upper cliffs of Smelter Mountain. The thickness of the Point Lookout Sandstone in the project area is approximately 400 ft.

Below the Point Lookout Sandstone is the Mancos Shale of Cretaceous age. Mancos Shale is typically a marine black shale interbedded with gray siltstone and minor thin dark-gray limestone beds and lenses.

3.2.2 Mill Tailings Area

The mill tailings area covers approximately 40 acres and is located on a bedrock-supported river terrace between Smelter Mountain to the west, the Animas River to the east and south, and Lightner Creek to the north (Figure 2).

Along the base of Smelter Mountain, surface material consists of a layer of colluvium up to 25 ft thick. Below the layer of colluvium is a layer up to 15 ft thick of alluvial river deposits and/or glacial outwash. The unconsolidated layers are underlain by dark gray to black Mancos Shale of Cretaceous Age, which is more than 1,700 ft thick. The Mancos Shale is truncated by the Smelter Mountain fault to the south. The Smelter Mountain fault is located between the mill tailings and the raffinate ponds areas.

A lead smelter located at near the south end of the mill tailings area operated from 1880 to 1930. A layer of vitreous lead smelter slag as much as 25 ft thick remains from the smelter operation near the southeast corner of the mill tailings area along the edge of the Animas River. In addition, a small lens of uranium ore was left in place below the layers of lead slag along portions of the riverbank.

Ground water in the colluvium near the base of Smelter Mountain is recharged primarily by runoff from the mountain and by infiltrating precipitation. The drainage basin upslope of the mill tailings area is small because of a steep cliff along the east side of Smelter Mountain. Therefore, the amount of recharge from this area is relatively small.

Alluvium deposits receive recharge from Lightner Creek and the Animas River. During spring runoff when the river stage is high, water flows into the aquifer. When the river stage is lower the ground water flows from the aquifer back into the Animas River. Some of the ground water may flow down through the colluvium into the underlying Mancos Shale. Ultimately, water from the site that moves through the Mancos Shale discharges into the Animas River. Because the permeability of the Mancos Shale is very low, only a small quantity of water passes by this route to the river as compared to the route through the more permeable alluvium/colluvium.

3.2.3 Raffinate Ponds Area

The raffinate ponds area occupies approximately 20 acres on another river terrace about 1,500 ft south of the mill tailings area. A narrow terrace above the Animas River connects the two areas.

A small intermittent creek called South Creek forms the southern boundary of the raffinate ponds area.

The Bodo Fault, which is a normal fault, dissects the raffinate ponds area and is northeast southwest trending and dips to the southeast at approximately 55 degrees. As a result of faulting, the Point Lookout Sandstone underlies the northwestern part and the Menefee Formation underlies the southeastern part of the raffinate ponds area. Associated with the fault in the raffinate ponds area is an andesite porphyry dike of probably Laramide age with appears to have intruded the fault along its entire length in the raffinate ponds area. This dike may be related to igneous activity that formed the La Plata Mountains approximately 10 miles northwest of the project area in late Cretaceous or Tertiary time.

Ground water below the raffinate ponds area is recharged by infiltration of precipitation and by ground water moving through the bedrock from the west. The elevations of both the alluvium/bedrock interface and the ground water are higher than the water level in the Animas River. Therefore, unlike the mill tailings area, the river does not recharge the aquifer in this area.

Based on the existing network of monitoring wells at the raffinate ponds area the ground water is within the bedrock and the alluvium is unsaturated. Ground water in the bedrock flows toward and discharges into the Animas River. Ground water flow in the Point Lookout Sandstone and Menefee Formation is mostly through open bedding planes and joints. Aquifer tests completed before surface remediation indicate ground water also flows through the fault cutting the bedrock.

Surface water flowing down South Creek during wet times may infiltrate the surficial deposits and recharge the ground water. Infiltration from South Creek also recharges the fault.

End of current text

4.0 Soil Chemistry and Leaching

Concentration of constituents in soil are determined through sample digestion, separation of the liquid phase by centrifuging or filtering, analysis of liquid phase constituent concentrations, and calculation of the concentrations in the solid phase. The most suitable digestion methods are those that remove only the loosely bound constituents because those have the highest potential for contaminating ground water and being accessible to plants and animals.

The choice of extraction method and leaching fluid determines the specific contaminants that can be extracted. The kinds of liquid media used to digest samples range from deionized water to strong acids combined with hot fluxing agents. Some digestion agents are designed to selectively remove specific mineral phases. For example, a mixture of sodium citrate, sodium dithionite, and sodium bicarbonate can selectively remove ferric oxyhydroxide minerals. A low pH solution would be used to desorb cations, and a high pH solution would be used to desorb anions. However, no solution can be completely selective. Some constituents, such as those adsorbed to mineral grains, are also released during the digestion. Numerous digestions with different solutions would be needed to provide a complete picture of contaminant distribution in a soil.

This project was intended to provide data for a screening-level assessment of soil that would be accessible to plants and animals. A 5 percent solution of nitric acid (HNO_3) was used for digestion. This acidic solution should release the adsorbed cations and dissolve the carbonate minerals. Although anions adsorb more strongly at low pH, they should also be released because the acid will dissolve most of the amorphous oxyhydroxide adsorbent phases. Five-percent HNO_3 will not dissolve most silicate minerals, which is desirable because the constituents in silicate minerals are not readily available to ground water.

To help interpret the soil data, samples were collected from background areas. These areas have similar lithology and could not have been affected by milling operation. Comparison to background samples, which were prepared according to the same method as on-site samples, helped to determine if the on-site samples contained releasable mill-related contaminants.

End of current text

5.0 Methods

Soil samples were collected from locations most likely to be contaminated by using a backhoe. Two samples were collected from each location; both were collected above the water table. Samples were taken from the backhoe bucket at depths ranging from 2 to 6 ft. Two samples, 0913 from 3.5 ft deep and 0914 from 3 ft deep, were obtained from the Menefee Formation and Point Lookout Sandstone Formation rock units, respectively. In these locations a soil sample could not be collected at these depths. The samples were collected as individual grab samples.

Background samples were collected from areas off-site. Two samples of colluvium (0931–COL and 0932–COL) were collected upgradient from the site, from along the base of Smelter Mountain. One sample of alluvium was collected about 1500 ft upstream from the site along the Animas River (0930–AL).

Soil samples were placed in plastic resealable bags and transported to ESL. The soil samples were placed in stainless steel trays and air-dried. To aid the drying process, the soils were stirred and clumps were disaggregated by hand. Large sticks, rootlets, and pebbles were removed by hand. After drying was complete, samples were passed through a 2-millimeter (mm) (10 mesh) sieve. The fraction less than 2 mm was used for leaching.

Two grams of each sample were weighed and divided equally into two 50 milliliters (mL) centrifuge tubes. Each centrifuge tube received 50 mL of 5 percent (volume to volume) HNO_3 The tubes were agitated end over end for 4 hours then centrifuged for 30 minutes at approximately 3,000 revolutions per minute (rpm). The supernatant from both tubes was decanted into a 200 mL volumetric flask. The remaining soil in the tubes was washed with 50 mL of 5 percent HNO_3 to remove the remaining constituents. After the addition of 5 percent HNO_3, the tubes were agitated end over end for 30 minutes then centrifuged for 30 minutes at approximately 3,000 rpm. The supernatant was added to the 200 mL volumetric flask. Five percent HNO_3 was added to fill the 200 mL volumetric flask to volume. Samples were filtered through a 0.45 micrometer filter and submitted to the GJO Analytical Chemistry Laboratory for analysis of cadmium, lead, molybdenum, selenium, and uranium. Analytical methods are listed in Table 1. Additional preservation was not necessary because the samples were HNO_3 solutions. Samples were kept at less than 4°C prior to analysis.

End of current text

6.0 Results and Discussion

6.1 Mill Tailings Area

A total of 19 samples were collected from 11 locations. Two samples from different depths were collected from each location, except samples from locations 0930, 0931, and 0932. Each is a single surface sample. For the paired samples, sample names include their location and collection depth. For example, sample 0918-5 ft is from location 0918 and a collection depth of 5 ft below the surface.

All sample pairs have similar lithology. Samples differ in the amount and type (well-rounded, angular, sandstone, etc.) of rock greater than 2 mm in diameter. However, the less than 2 mm fractions are mostly silt. One sample, 0918-5 ft, contains slag, which is solid waste material left from the operation of the lead smelter.

6.1.1 Cadmium

Cadmium concentrations are provided in Table 2 and shown in Figure 4. Concentrations range from 0.096 mg/kg (0918-3 ft) to 7.20 mg/kg (0917-2 ft). The mean crustal concentration of cadmium is 0.2 mg/kg. Most samples have cadmium concentrations that are greater than the mean crustal concentration. Only six samples (0915-3 ft, 0915-5 ft, 0918-3 ft, 0919-4 ft, 0920-5 ft, and 0921-4 ft) have cadmium concentrations that are less than the mean crustal value.

The concentrations of all background samples are greater than the crustal mean and range from 0.57 mg/kg (0932–COL) to 1.27 mg/kg (0930–AL). This suggests that cadmium is a natural constituent in soils. Significantly elevated cadmium concentrations are related to milling activities.

Cadmium concentrations increase substantially with depth at location 0918. Sample 0918-3 ft has a concentration of 0.096 mg/kg cadmium and 0918-5 ft has a concentration of 5.15 mg/kg. The cadmium concentration in sample 0918-5 ft is over 50 times greater than sample 0918-3 ft. Slag is present in sample 0918-5 ft and may account for the high cadmium concentration measured. Samples from location 0922 show a slight increase of cadmium concentration with depth. Sample 0922-2 ft has a cadmium concentration of 0.20 mg/kg and 0922-3 ft has a concentration of 0.28 mg/kg, which is 1.4 times greater than that of sample 0922-2 ft. All remaining sample pairs show a decrease of cadmium concentration with depth.

Under oxidizing conditions and low pH, less than 7, cadmium is soluble and mobile. As the pH rises, the cadmium concentration decreases. At first, the concentration decrease is due to adsorption and then it is due to the limited solubility of carbonates and oxides/hydroxides. Cadmium response is similar under reducing conditions, except in the presence of sulfur. If sulfur is present, cadmium will precipitate as a sulfide. Cadmium, itself, does not readily respond to changes in redox conditions. However, cadmium does respond to redox changes occurring in sulfur species and in iron and manganese oxyhydroxides, which are important substrates for adsorption. Potential exists for cadmium to be adsorbed onto calcite. Cadmium may precipitate with manganese oxide.

6.1.2 Lead

Lead concentrations are listed in Table 2 and shown in Figure 5. Concentrations range from 5.67 mg/kg (0918-3 ft) to 6, 660 mg/kg (0918-5 ft). The mean crustal composition of lead is 13 mg/kg. Seven samples have concentrations that are greater than the mean crustal composition. The lead concentration of sample 0918-5 ft (6, 660 mg/kg) is significantly elevated above all other samples.

The concentrations of background samples 0931–COL and 0930–AL are greater than the crustal mean. Sample 0930–AL is a background sample collected upstream from the site. It has the second-highest lead concentration, which is 141 mg/kg. The presence of lead in concentrations greater than the crustal mean in background samples indicates that lead is available in the environment and that the soils are able to adsorb it. Moreover, the source of lead contamination cannot be solely attributed to uranium milling activity.

Lead concentrations decrease with depth at all locations, except location 0918. At location 0918, lead concentration increases from 5.67 mg/kg (0918-3 ft) to 6, 660 mg/kg (0918- 5 ft). Slag, which is present in sample 0918-5 ft, may be the reason for the extremely high lead concentration.

Mobility of lead is naturally low because of its low solubility under both oxidizing and reducing conditions. If sulfur is present under reducing conditions lead will precipitate as a sulfide. Under oxidizing conditions, lead may coprecipitate with manganese oxide and can adsorb onto organic matter and inorganic surfaces, such as manganese and iron oxides. Under oxidizing conditions, the lead species $PbSO_4^0$ is important at SO_4^{2-} concentrations greater than about 96 mg/L. If iron or manganese solids are not present in sufficient amounts to scavenge all the lead from solution, lead as $PbSO_4^0$ may precipitate from solution. In the atmosphere, lead can be circulated by dry fallout and rainout; precipitation can then remove the dry, lead-rich particulates from the air and deposit them into the ground and to rivers and streams.

6.1.3 Molybdenum

Molybdenum concentrations are listed in Table 2 and are shown in Figure 6. Concentrations range from less than the detection limit of 0.08 mg/kg (in 10 samples) to 10.80 mg/kg (0918-5 ft). Samples 0917-4 ft and 0918-5 ft have molybdenum concentrations that are greater than the mean crustal concentration of 1.5 mg/kg.

The molybdenum concentrations of the background samples are less than the crustal mean and range in concentration from 0.13 mg/kg (0932–COL) to 0.66 mg/kg (0931–COL). Molybdenum does not appear to be a natural constituent of these soils. Elevated molybdenum concentrations may be attributed to milling activity.

Samples from locations 0917 and 0918 have molybdenum concentrations that increase with depth. The molybdenum concentration of sample 0917-4 ft (2.18 mg/kg) is about 2.5 times greater than that of 0917-2 ft (0.88 mg/kg). Lithology of this location is similar to that of the other paired samples, except those from location 0918. The high molybdenum concentration in sample 0917-4 ft may be limited to this location and this depth. The molybdenum concentration of sample 0918-5 ft (10.8 mg/kg) is about 113 times greater than that of 0918-3 ft (0.096 mg/kg).

It is possible that slag contributes to the high molybdenum concentration found in sample 0918-5 ft. At all other locations, the molybdenum concentrations decrease with depth.

Molybdenum has a relatively high geochemical mobility. Its low solubility allows it to enter into solution in water under oxidizing conditions. Molybdenum will precipitate from reduced waters. Solubility controls include precipitation with common metals as metal molybdates. The effectiveness of this control depends on the solubility of the metal. Molybdenum can be adsorbed by amorphous ferric oxyhydroxides. The solubility product for calcium molybdate suggests that water with substantial Ca^{2+} concentrations should not have large dissolved molybdenum concentrations. Molybdenum is an accessory element in many metal ores. Soluble molybdates may be produced in oxidized areas of the deposits. As a result, molybdenum may appear in detectible concentrations in stream water, sediments, ground water, and vegetation at considerable distances from their source.

6.1.4 Selenium

Selenium concentrations are listed in Table 2 and shown in Figure 7. Concentrations range from less than the detection limit of 0.35 mg/kg (in 4 samples) to 2.00 mg/kg (0918-5 ft). The mean crustal concentration of selenium is 0.05 mg/kg. All samples exceed this mean.

Selenium concentrations in background samples exceed the mean crustal concentration and range from 0.60 mg/kg (0930–AL), to 0.88 mg/kg (0931–COL). This suggests that selenium is a natural constituent in soils. Significantly elevated selenium concentrations are related to milling activities.

Selenium concentrations increase with depth at locations 0915, 0918, 0920, and 0921. The selenium concentration in sample 0915-5 ft (0.49 mg/kg) is 1.2 times greater than in sample 0915-3 ft (0.41 mg/kg), 0918-5 ft (2.00 mg/kg) is 2.9 times greater than 0918-3 ft (0.68 mg/kg), 0920-5 ft (0.92 mg/kg) is 2.6 times greater than 0920-2 ft (0.35 mg/kg), and 0921-4 ft (0.86 mg/kg) is 1.3 times greater than 0921-2 ft (0.64 mg/kg). The deeper sample from location 0918 has a different lithology than all other samples. Sample 0918-3 ft is similar to other shallow samples; they are generally silt material. Sample 0918-5 ft contains slag in addition to the fill material and silt that is common to other samples collected at a greater depth. All remaining samples have selenium concentrations that decrease with depth.

In some respects selenium chemistry is similar to that of sulfur. Under oxidizing conditions selenium occurs as selenate (SeO_4^{2-}). Selenate is readily reduced to elemental and relatively insoluble Se^0. In the presence of iron, selenium may coprecipitate with iron sulfides under reducing conditions. Selenium in oxidized form is weakly adsorbed to ferric oxyhydroxides.

6.1.5 Uranium

Uranium concentrations are listed in Table 2 and shown in Figure 8. Concentrations range from 0.30 mg/kg (0920-5 ft) to 42.4 mg/kg (0918-5 ft). Five samples (0919-2 ft, 0919-4 ft, 0917-2 ft, 0917-4 ft, and 0918-5 ft) have uranium concentrations that are greater than the earths mean crustal concentration of 1.80 mg/kg.

All samples show decreasing concentrations with depth, except samples from location 0918. The uranium concentration increases about 120 times from sample 0918-3 ft (0.35 mg/kg) to 0918-5 ft (42.4 mg/kg). The presence of slag in sample 0918-5 ft is the only difference between this and all other samples. The most important potential sorbent for uranium are iron oxyhydroxides followed by organic matter.

Under oxidizing conditions, uranium is soluble in ground water and mobile due to the presence of aqueous carbonate, a strong complexing agent. Uranium is often sequestered by adsorption to iron oxyhydroxides in soil. Under strongly reducing conditions, uranium can precipitate as uraninite (UO_2).

6.1.6 Discussion

The three background samples, 0930–AL, 0931–COL, and 0932–COL, generally have higher constituent concentrations than most of the samples collected. Elevated cadmium, lead, and selenium concentrations in background samples suggest the constituents are natural components of the rocks and soil. Concentrations of molybdenum and uranium in background samples are less than the mean crustal concentrations, which indicates that these constituents are not natural rock and soil components. Significantly elevated concentrations of cadmium, lead, and selenium and elevated concentrations (greater than the crustal mean) of molybdenum and uranium indicate an anthropogenic source.

Elevated constituent concentrations at some locations (such as 0917) indicate that mill processes may have influenced soil chemistry. While concentrations of cadmium, lead, and selenium appear to be naturally greater than the crustal mean, significantly elevated constituent concentrations, such as sample 0918-5 ft, appear to be limited to small, separate areas. Likewise, elevated concentrations of molybdenum and uranium appear to be limited in area. Samples with elevated concentrations are few and separate enough to suggest that the concentrations may not be a significant, continuing source of contamination.

Increases in concentration from sample 0918-3 ft to 0918-5 ft occur in all measured constituents (cadmium, lead, molybdenum, selenium, and uranium). The concentration increases range from 2.9 to 1175 times larger in the deeper sample (0918-5 ft). Slag was collected with soil in sample 0918-5 ft while no slag was collected in sample 0918-3 ft. The slag is associated with the operation of the lead smelter and could be expected to contain high concentrations of lead. Due to the presence of the slag, it is difficult to assess the nature of the elevated concentrations of cadmium, molybdenum, selenium, and uranium. The chemical composition of the slag is unknown. Cadmium, molybdenum, selenium, and uranium may have been present in the material used for operation of the lead smelter. The high constituent concentrations in sample 0918-5 ft is likely attributed to the presence of slag.

6.2 Raffinate Ponds Area

A total of 20 samples were collected from 9 locations. Two samples were collected from each location, except the samples from location 0903. At location 0903, four background samples were collected at depths of 4 ft, 14 ft, 23 ft, and 28 ft. Two samples, 0913-4 ft and 0914-3 ft were rock core samples and were crushed to obtain the required less than 2 mm fraction.

Like samples from the mill tailings area, the lithology of the samples is similar, except samples 0913-4 ft and 0914-3 ft. Variations in lithology are largely due to amount of silt and the amount, rounding, and type of rock material present and the less than 2 mm fractions are generally silty. Samples 0913-4 ft and 0914-3 ft are exceptions. Sample 0913-4 ft was collected as a consolidated core sample of unweathered medium light gray sandstone from the Menefee Formation. Sample 0914-3 ft was collected as a consolidated sample of shale from the Point Lookout Sandstone Formation. Background samples collected from location 0903 are unconsolidated deposits that fit the general description of the majority of samples. Sample 0903-4 ft is remediation-imported soil, 0903-14 ft is colluvium with minor amounts of black carbonaceous shale material, 0903-23 ft is colluvium with minor amounts of black carbonaceous shale material, and 0903-28 ft is colluvium.

6.2.1 Cadmium

Cadmium concentrations are listed in Table 3 and shown in Figure 9. Concentrations range from 0.041 mg/kg (0903-4 ft) to 13.4 mg/kg (0914-2 ft). The mean crustal concentration of cadmium is 0.2 mg/kg. Most samples have concentrations that are greater than the crustal mean. Only 5 samples (0903-4 ft, 0903-14 ft, 0903-28 ft, 0911-2 ft, and 0913-4 ft) have concentrations that are less than the crustal mean.

Concentrations of background samples are generally less than the mean crustal concentration. The concentration of sample 0903-23 ft (2.17 mg/kg) is greater than the crustal mean. The remaining background samples range in concentration from 0.041 mg/kg (0903-4 ft) to 0.110 mg/kg (0903-28 ft). Cadmium does not appear to be a natural constituent of these soils. Elevated cadmium concentrations may be attributed to milling activity.

The cadmium concentrations increase with depth in sample pairs from locations 0911, 0924, 0925, and 0927. The deeper samples have concentrations that are 2, 2.4, 1.4, and 1.5 times greater than the shallow sample, respectively. In samples from the background location 0903, concentration in 0903-14 ft is 1.4 times greater than in 0903-4 ft, and the concentration of 0903-23 ft is 38 times greater than in 0903-14 ft. Both 0903-14 ft and 0903-23 ft contain black carbonaceous material. Contact with the reducing conditions of 0903-14 ft may have initiated a series of redox reactions that resulted in the deposition of cadmium at a depth of 23 ft. Natural organic matter can adsorb cadmium where the concentration of organic matter and cadmium are relatively high. Iron and manganese oxyhydroxides are important substrates for adsorption.

6.2.2 Lead

Lead concentrations are listed in Table 3 and are shown in Figure 10. Concentrations range from 4.40 mg/kg (0903-4 ft) to 13.6 mg/kg (0914-3 ft). The mean crustal composition of lead is 13 mg/kg, only sample 0914-3 ft has a concentration that is greater.

Concentrations in background samples are less than the mean crustal concentration. Lead does not appear to be a natural constituent of these soils. Elevated lead concentrations may be attributed to milling activity.

The concentration in sample pairs from locations 0914 and 0926 increases with depth 1.8 and 1.3 times, respectively. Samples from location 0926 have similar lithology as the other paired

samples. The concentration increase in this sample pair may be the result of a local variation in the fill material used. In contrast, the concentration increase in the samples from location 0914 may be due to changes in lithology. Sample 0914-3 ft is shale and siltstone from the Point Lookout Sandstone Formation. Lead may have adsorbed to soil surfaces. Of the background samples, the concentration of sample 0903-28 (terrace alluvium) ft is 2.2 times greater than sample 0903-23 ft (colluvium). Alluvial material with a high lead concentration may have been deposited from an upstream location and may account for the increase in concentration.

6.2.3 Molybdenum

Molybdenum concentrations are listed in Table 3 and are shown in Figure 11. Concentrations range from 0.080 mg/kg (0911-2 ft) to 0.390 mg/kg (0914-3 ft). The mean crustal concentration of molybdenum of 1.5 mg/kg and no sample exceeds this value.

No sample concentration is greater than the mean crustal concentration; consequently molybdenum does not appear to be a natural constituent of these soils. Background concentrations range from 0.110 mg/kg (0903-14 ft) to 0.130 mg/kg (0903-23 ft). Elevated molybdenum concentrations may be attributed to milling activity.

Concentration increases with depth at three locations, 0913, 0914, 0924, and 0926; concentrations are 3.5, 4.9, 1.3, and 1.4 times greater, respectively, in the deeper samples. In samples from locations 0913 and 0914, the shallow samples are silt and the deeper samples are bedrock samples of sandstone and shale, respectively. Molybdenum is mobile in ground water; it enters into solution easily. It can be adsorbed by amorphous ferric oxyhydroxides. It may be a natural component of the Menefee Formation and the Point Lookout Sandstone Formation. The increase seen in the pair of samples from locations 0924 and 0926 may be due to local variations in the soil.

6.2.4 Selenium

Selenium concentrations are listed in Table 4 and are shown in Figure 12. Concentrations range from less than the detection limit of 0.350 mg/kg (5 samples) to 2.77 mg/kg (0914-2 ft). The mean crustal concentration of selenium is 0.05 mg/kg. Concentrations in all samples are greater than the mean crustal value.

Concentrations of selenium in the four background samples collected at location 0903 are less than the detection limit of 0.350 mg/kg, the detection limit is greater than the crustal mean. This may indicate that background concentrations of selenium could be less than the crustal mean.

Samples from locations 0911 and 0924 have concentrations that increase with depth. The concentration in sample 0911-6 ft is 1.1 times greater than in sample 0911-2 ft and sample 0924-5 ft is 1.8 times greater than sample 0924-2 ft. The increase seen in these samples may be due to local variations in the soil.

6.2.5 Uranium

Uranium concentrations are listed in Table 3 and are shown in Figure 13. Concentrations range from 0.180 mg/kg (0903-4 ft and 0903-14 ft) to 19.5 mg/kg (0926-2 ft). Half of the samples have uranium concentrations that are greater than the mean crustal concentration of 1.80 mg/kg.

Background sample concentrations are less than the crustal mean and range from 0.180 mg/kg (0903-4 ft and 0903-14 ft) to 0.290 mg/kg (0903-23 ft). Uranium does not appear to be a natural constituent of these soils. Elevated uranium concentrations may be attributed to milling activity.

Concentrations increase with depth at locations 0911 and 0924, 2.2 and 3.2 times, respectively. These samples do not have unusual lithology. Sample 0903-23 ft has a concentration that is 1.6 times greater than that of sample 0903-14 ft. Both samples contain minor amounts of black carbonaceous shale material. Iron oxyhydroxides are the most important potential sorbents for uranium followed by organic matter. Organic matter may also reduce uranium, significantly decreasing its solubility and resulting in precipitation. Interaction with the first carbonaceous layer may have altered the redox state of uranium to induce deposition of uranium in the second, deeper carbonaceous layer resulting in a higher uranium concentration.

6.2.6 Discussion

The selenium concentrations of all samples are greater than the crustal mean concentration. Background concentrations of cadmium, lead, molybdenum, and uranium are less than the mean crustal concentrations. The higher concentrations of cadmium and lead that were seen in the mill tailings area are not seen in the raffinate ponds area.

Both samples from locations 0912, 0924, 0926, and 0927 have cadmium and uranium concentrations that are greater than the crustal mean concentrations. Both samples from locations 0914 and 0925 have cadmium concentrations that are greater than the crustal mean. The uranium concentration of sample 0914-2 ft and 0913-2 ft, and the lead concentration of 0914-3 ft are greater than the crustal mean concentrations. Cadmium concentration of samples 0903-23 ft, 0911-6 ft, and 0913-2 ft are greater than the crustal mean.

These local areas of elevated constituent concentrations suggest that mill processes influenced soil chemistry. While some samples have constituent concentrations greater than crustal mean concentrations, overall, the concentrations may not be a significant, continuing source of contamination.

6.3 Conclusions

6.3.1 Mill Tailings Area

Most samples and all background samples have cadmium concentrations that are greater than the mean crustal concentration of 0.2 mg/kg. All samples, including background samples, exceed the crustal mean selenium concentration of 0.05 mg/kg. This suggests that cadmium and selenium may be natural constituents in soils. Some of the elevated cadmium and selenium concentrations founding the subpile soils are likely related to milling activities.

Lead concentrations of seven samples are greater than the mean crustal composition of 13 mg/kg. The concentrations of background samples 0931–COL and 0930–AL are greater than the crustal mean. The presence of lead in concentrations greater than the crustal mean in background samples indicates that lead is available in the environment and that the soils are able to adsorb it. Moreover, the source of lead contamination cannot be solely attributed to uranium milling activity.

Only two samples have molybdenum concentrations that are greater than the mean crustal concentration of 1.5 mg/kg. The molybdenum concentrations of the background samples are less than the crustal mean. Five samples uranium concentrations that are greater than the mean crustal concentration of 1.80 mg/kg. Background sample concentrations are less than the mean crustal concentration. Molybdenum and uranium do not appear to be a natural constituent of these soils. Elevated molybdenum and uranium concentrations may be attributed to milling activity.

Elevated constituent concentrations in locations, such as 0917, indicate that mill processes may continue to influence soil chemistry. While concentrations of cadmium, lead, and selenium appear to be naturally greater than the crustal mean, significantly elevated constituent concentrations, such as sample 0918-5 ft, appear to be limited to small, separate areas. Likewise, elevated concentrations of molybdenum and uranium appear to be limited in area. Samples with elevated concentrations are few and separate enough to suggest that the concentrations may not be significant enough to be a continuing source of contamination.

6.3.2 Raffinate Ponds Area

The mean crustal concentration of selenium is 0.05 mg/kg. Concentrations in all samples are greater than the mean crustal value. Background samples have concentrations that are greater than the crustal mean. This may indicate that selenium is a natural component of the rocks and soil of the area.

Most samples have cadmium concentrations that are greater than the crustal mean of 0.2 mg/kg. One sample has a lead concentration that is greater than the crustal mean of 13 mg/kg. The mean crustal concentration of molybdenum is 1.5 mg/kg and no sample concentration is greater than the mean crustal concentration. Half of the samples have uranium concentrations that are greater than the mean crustal concentration of 1.80 mg/kg. Constituent concentrations in background samples are less than the mean crustal constituent concentrations. Cadmium, lead, molybdenum, and uranium do not appear to be natural constituents of these soils. The higher concentrations of cadmium and lead that were seen in the mill tailings area are not seen in the raffinate ponds area. Elevated constituent concentrations may be attributed to milling activity.

Elevated concentrations of cadmium, lead, molybdenum, and uranium suggest that mill processes influenced soil chemistry. As in the mill tailings area, high constituent concentrations are limited to small, separate areas. Overall, the concentrations may not be significant enough to be a continuing source of contamination.

7.0 References

U.S. Department of Energy (DOE), 1999, Environmental Sciences Laboratory Procedures Manual, GJO–99–124–TAR, prepared for U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado.

———, 2000. *Summary of Site Conditions and Work Plan, Durango, Colorado*, GJO–2000–155–TAR, prepared for U.S. Department of Energy Grand Junction Office, Grand Junction, Colorado, August.

Mason, B. and Moore, C.B., 1982. *Principles of Geochemistry*, Fourth Edition. New York: John Wiley & Sons.

End of current text

Table 1. Analytical Methods

Constituent	Lab	Procedure	Description
Cadmium	ACL	AS–6 R06	ICP–MS
Lead	ACL	AS–6 R06	ICP–MS
Molybdenum	ACL	AS–6 R06	ICP–MS
Selenium	ACL	AS–5 R06	ICP–AES
Uranium	ACL	AS–6 R06	ICP–MS

ACL = Analyses performed at the GJO ACL
ICP–AES = Inductively Coupled Plasma- Atomic Emission Spectrometry
ICP–MS = Inductively Coupled Plasma- Mass Spectrometry

Table 2. Constituent Concentrations in Durango Mill Tailings Area Soil Samples

Sample		Cadmium		Lead	Molybdenum		Selenium		Uranium
Location	Depth (ft)	(mg/kg)	DQ[c]	(mg/kg)	(mg/kg)	DQ	(mg/kg)	DQ	(mg/kg)
0915	3	0.14		8.58	0.08	U	**0.41**	B	0.36
0915	5	0.10		6.98	0.08	U	**0.49**	B	0.34
0916	3	**0.25**		**13.8**	0.08	U	**0.35**	U	0.48
0916	5	**0.21**		12.7	0.08	U	**0.35**	U	0.49
0917	2	**7.20**		**79.6**	0.88	B	**1.31**		**21.8**
0917	4	**4.17**		**42.5**	**2.18**		**1.29**		**10.7**
0918	3	0.096	B	5.67	0.096	B	**0.68**		0.35
0918	5	**5.15**		**6660**	**10.8**		**2.00**		**42.4**
0919	2	**0.76**		9.23	0.087	B	**0.56**		**6.90**
0919	4	0.18		7.37	0.08	U	**0.47**	B	**3.24**
0920	2	**0.25**		**14.7**	0.08	U	**0.35**	U	0.50
0920	5	0.17		6.47	0.08	U	**0.92**		0.30
0921	2	**0.22**		9.35	0.091	B	**0.64**		1.72
0921	4	0.17		9.10	0.08	U	**0.86**		0.72
0922	2	0.20		11.4	0.08	U	**0.37**	B	0.76
0922	3	**0.28**		11.7	0.08	U	**0.35**	U	0.75
0930	AI	**1.27**		**141**	0.50	B	**0.60**		0.77
0931	COL	**0.85**		**13.6**	0.66	B	**0.88**		1.22
0932	COL	**0.57**		6.95	0.13	B	**0.72**		0.54
Crustal Average[a]		0.2		13	1.5		0.05		1.8

AL = Alluvium, surface sample; COL = Colluvium, surface sample; DQ = Data Qualifiers; B = Reported value is less than the required detection limit but greater than or equal to the actual instrument detection limit; U = Value less than the detection limit. **Bold** = Concentrations greater than the average crustal value.
[a]From Mason and Moore 1982.

Table 3. Constituent Concentrations in Durango Raffinate Ponds Area Soil Samples

Sample		Cadmium		Lead	Molybdenum		Selenium		Uranium
Location	Depth (ft)	(mg/kg)	DQ[c]	(mg/kg)	(mg/kg)	DQ	(mg/kg)	DQ	(mg/kg)
903	4	0.041	B	4.40	0.12	B	**0.35**	U	0.18
903	14	0.057	B	4.81	0.11	B	**0.35**	U	0.18
903	23	**2.17**		4.50	0.13	B	**0.35**	U	0.29
903	28	0.11		10.0	0.12	B	**0.35**	U	0.21
911	2	0.19		8.45	0.08	U	**0.35**	U	0.41
911	6	**0.38**		6.62	0.08	U	**0.39**	B	0.90
912	2	**3.39**		5.21	0.23	B	**1.51**		**2.30**
912	5	**1.79**		5.96	0.31	B	**1.50**		**2.09**
913	2	**1.31**		12.6	0.093	B	**1.00**		**2.03**
913	4	0.081	B	6.14	0.33	B	**0.53**		0.29
914	2	**13.4**		7.63	0.08	U	**2.77**		**15.1**
914	3	**0.21**		**13.6**	0.39	B	**0.89**		0.61
924	2	**0.84**		10.7	0.096	B	**0.66**		**2.05**
924	5	**2.03**		9.34	0.12	B	**1.19**		**6.50**
925	2	**0.42**		10.6	0.18	B	**1.10**		1.27
925	5	**0.60**		9.95	0.15	B	**0.47**	B	1.17
926	2	**7.85**		5.96	0.11	B	**1.22**		**19.5**
926	4	**6.98**		7.71	0.16	B	**1.16**		**4.60**
927	3	**0.51**		6.46	0.08	U	**0.59**		**6.07**
927	5	**0.74**		7.16	0.08	U	**0.52**		**4.79**
Crustal Average[a]		0.2		13	1.5		0.05		1.8

DQ = Data Qualifiers; B = Reported value is less than the required detection limit but greater than or equal to the actual instrument detection limit; U = Value less than the detection limit. **Bold** = Concentrations greater than the average crustal value.

[a]From Mason and Moore 1982.

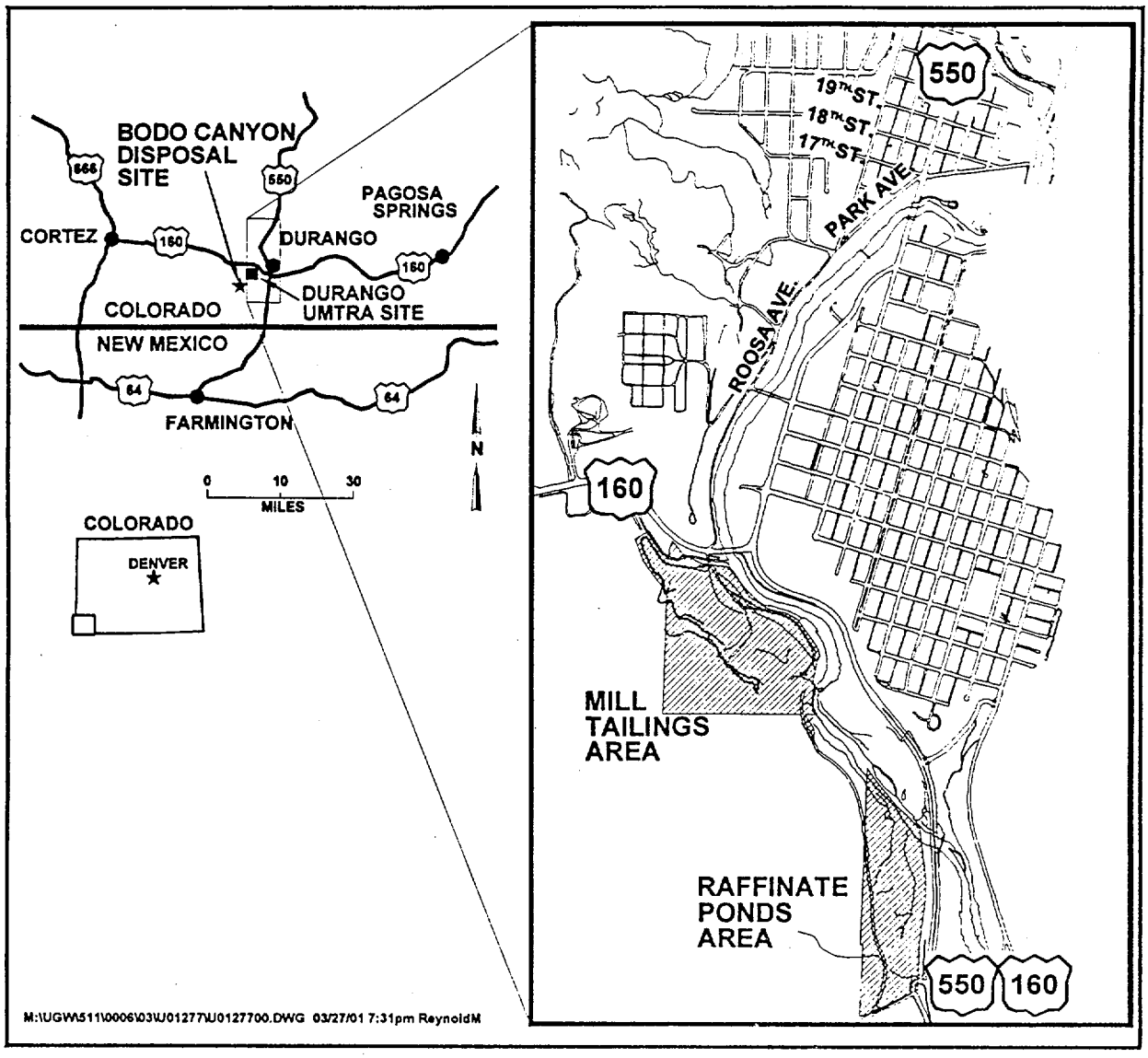

Figure 1. Regional Site Location Map

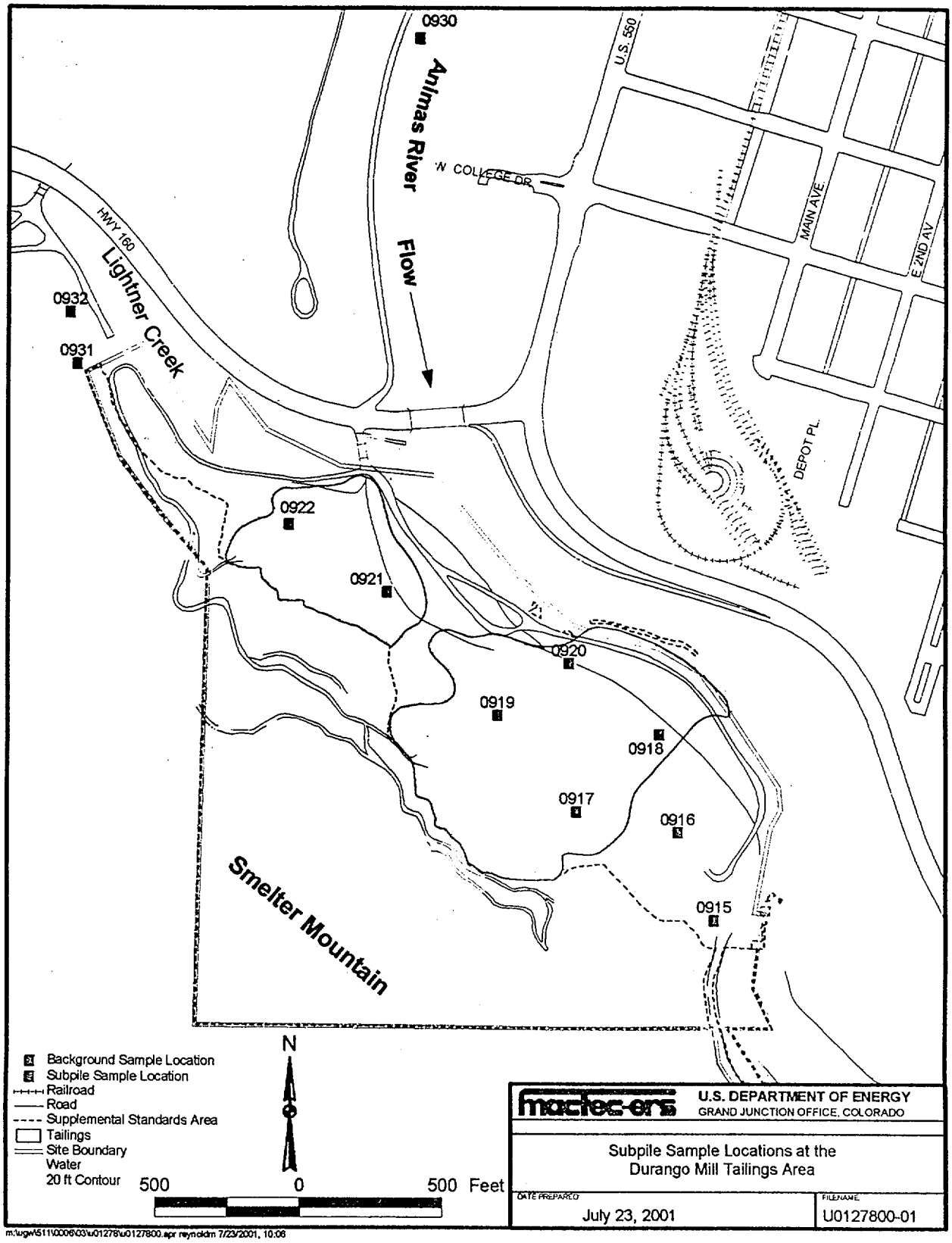

Figure 2. Subpile Sample Locations at the Durango Mill Tailings Area

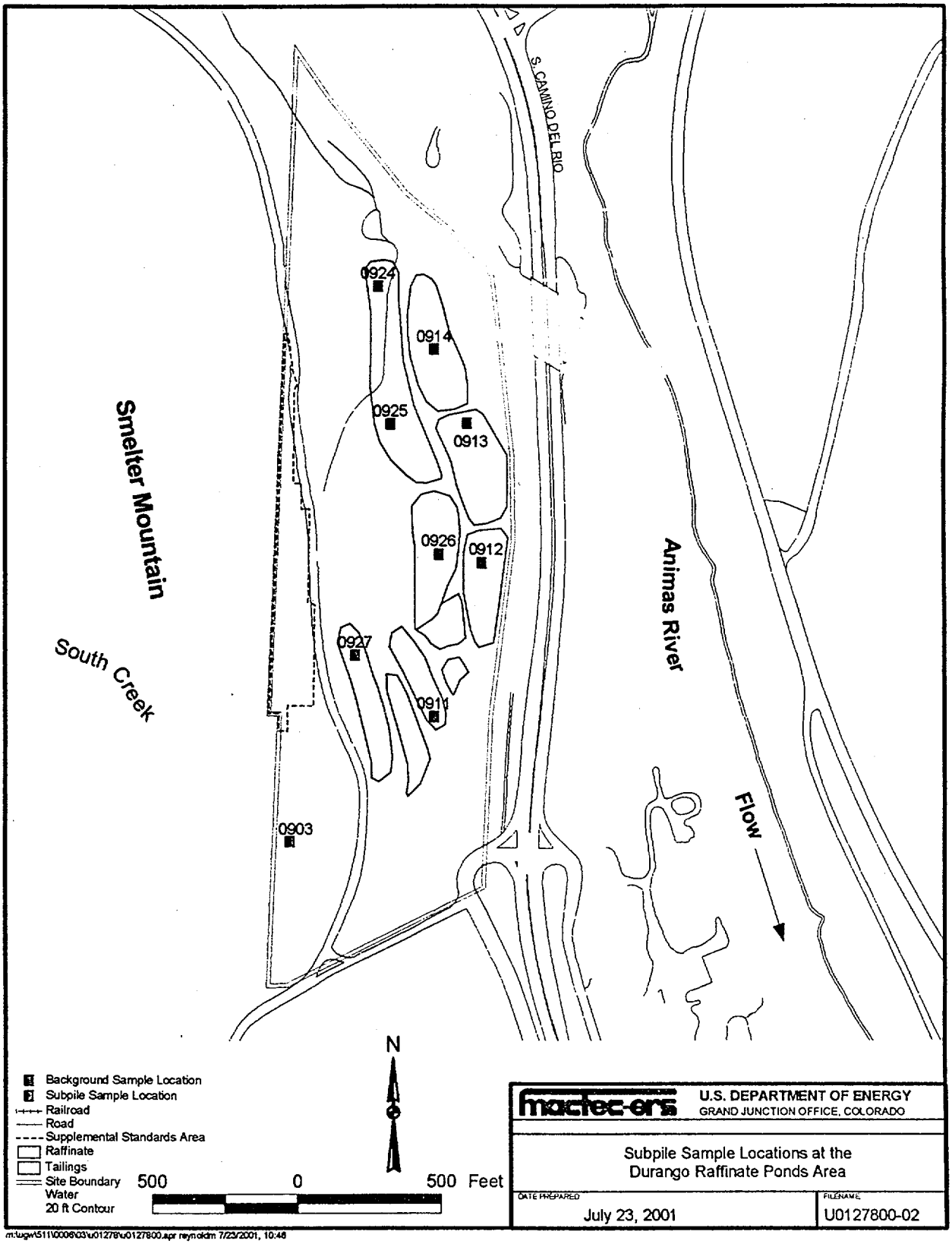

Figure 3. Subpile Sample Locations at the Raffinate Ponds Area

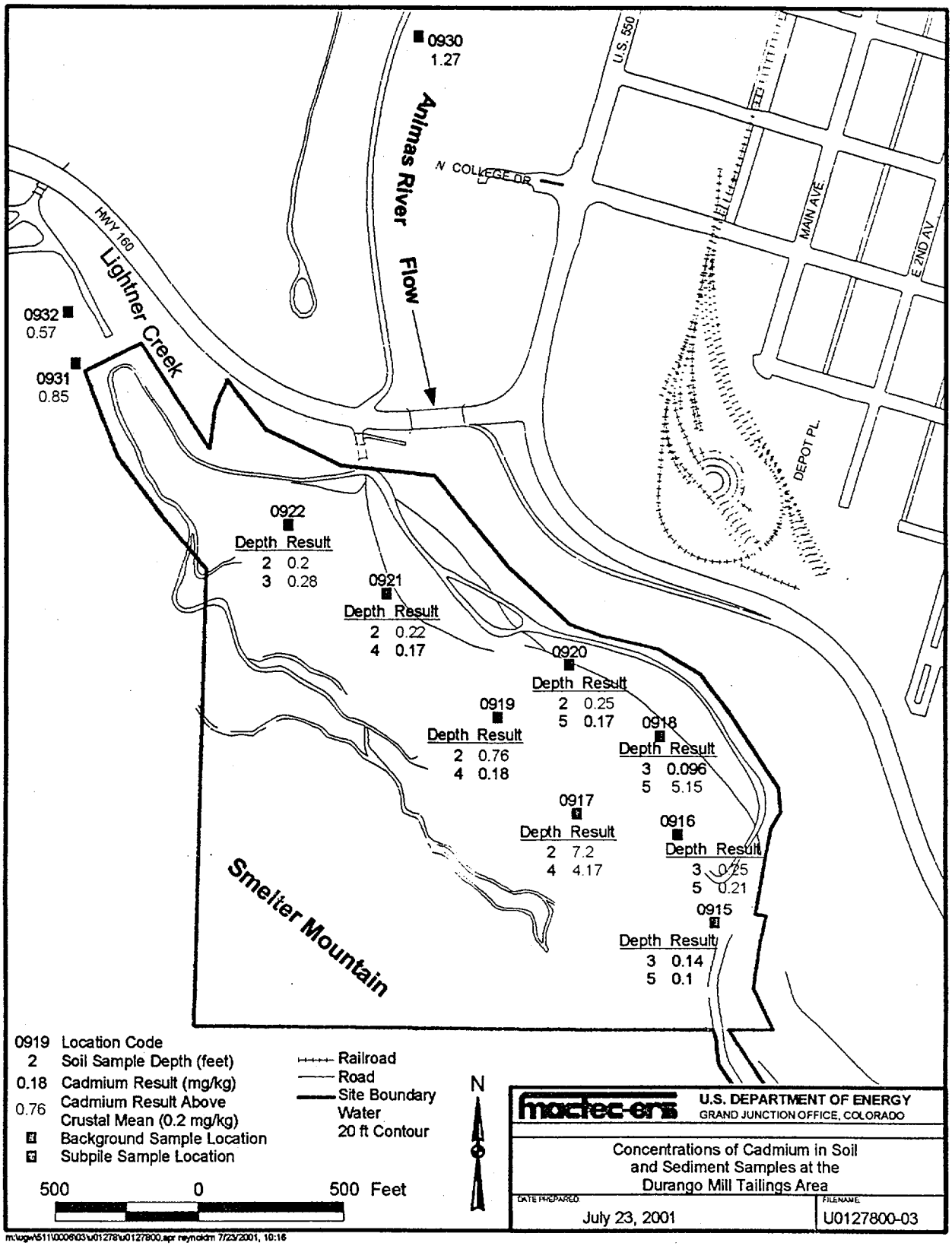

Figure 4. Concentrations of Cadmium in Soil and Sediment Samples at the Durango Mill Tailings Area

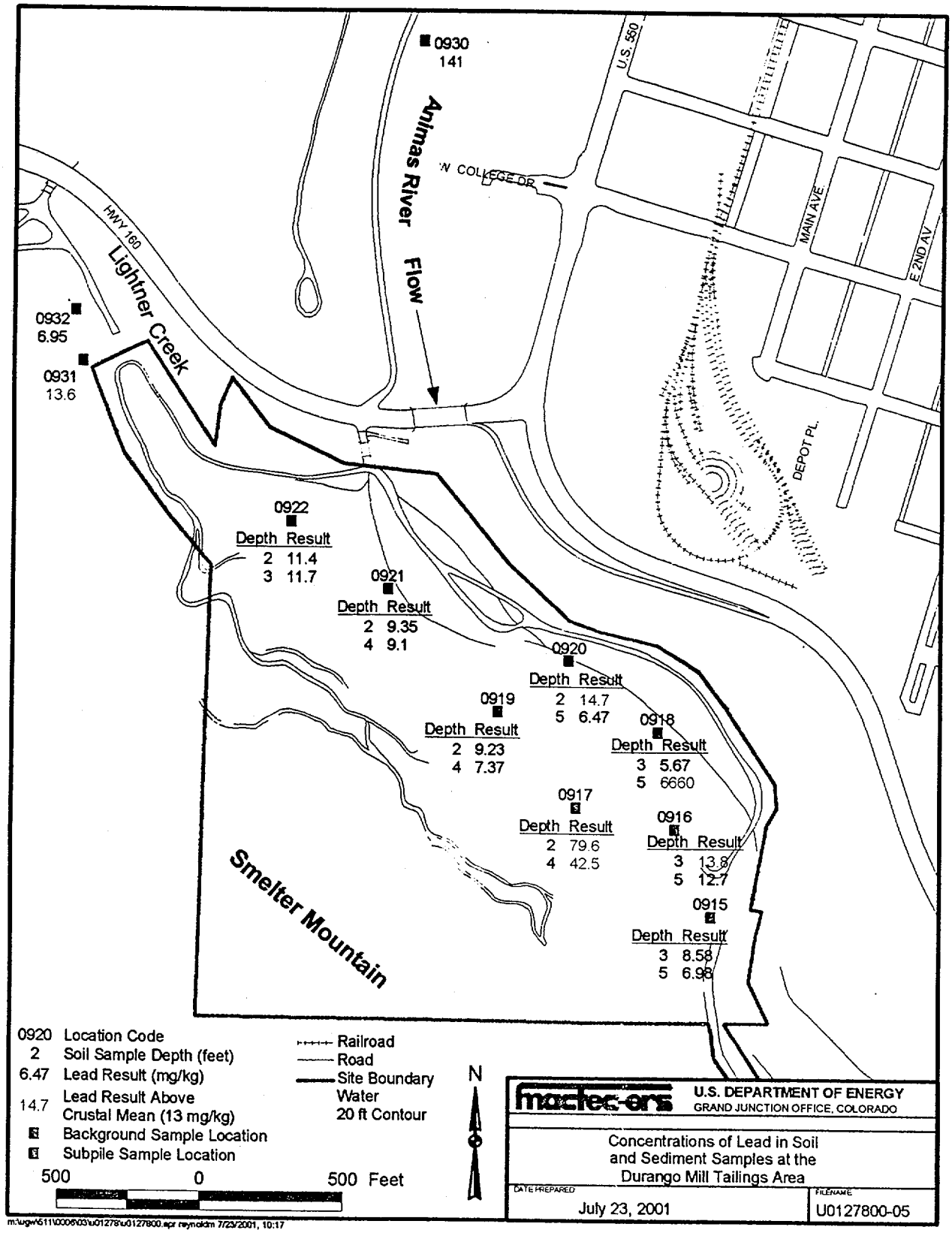

Figure 5. Concentrations of Lead in Soil and Sediment Samples at the Durango Mill Tailings Area

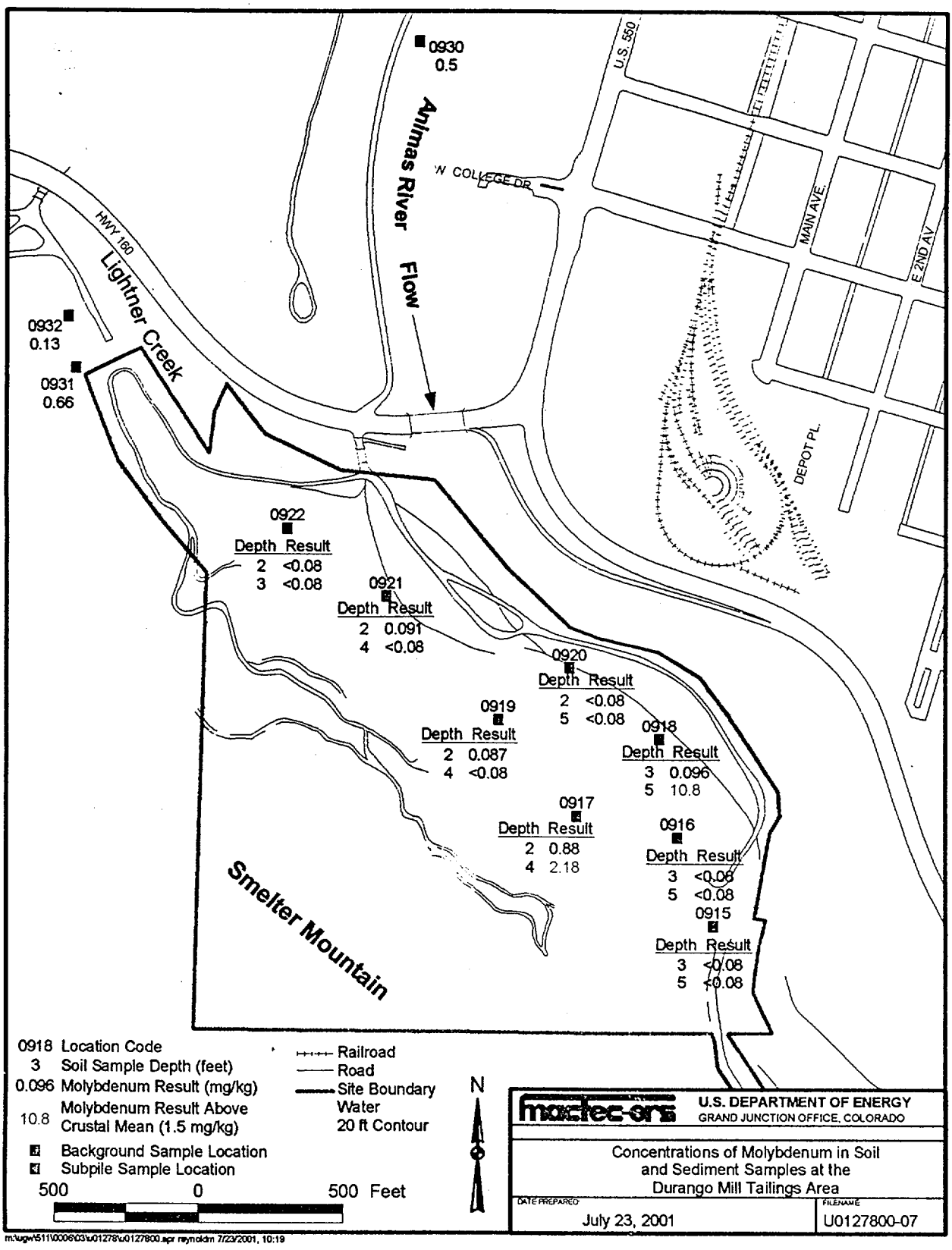

Figure 6. Concentrations of Molybdenum in Soil and Sediment Samples at the Durango Mill Tailings Area

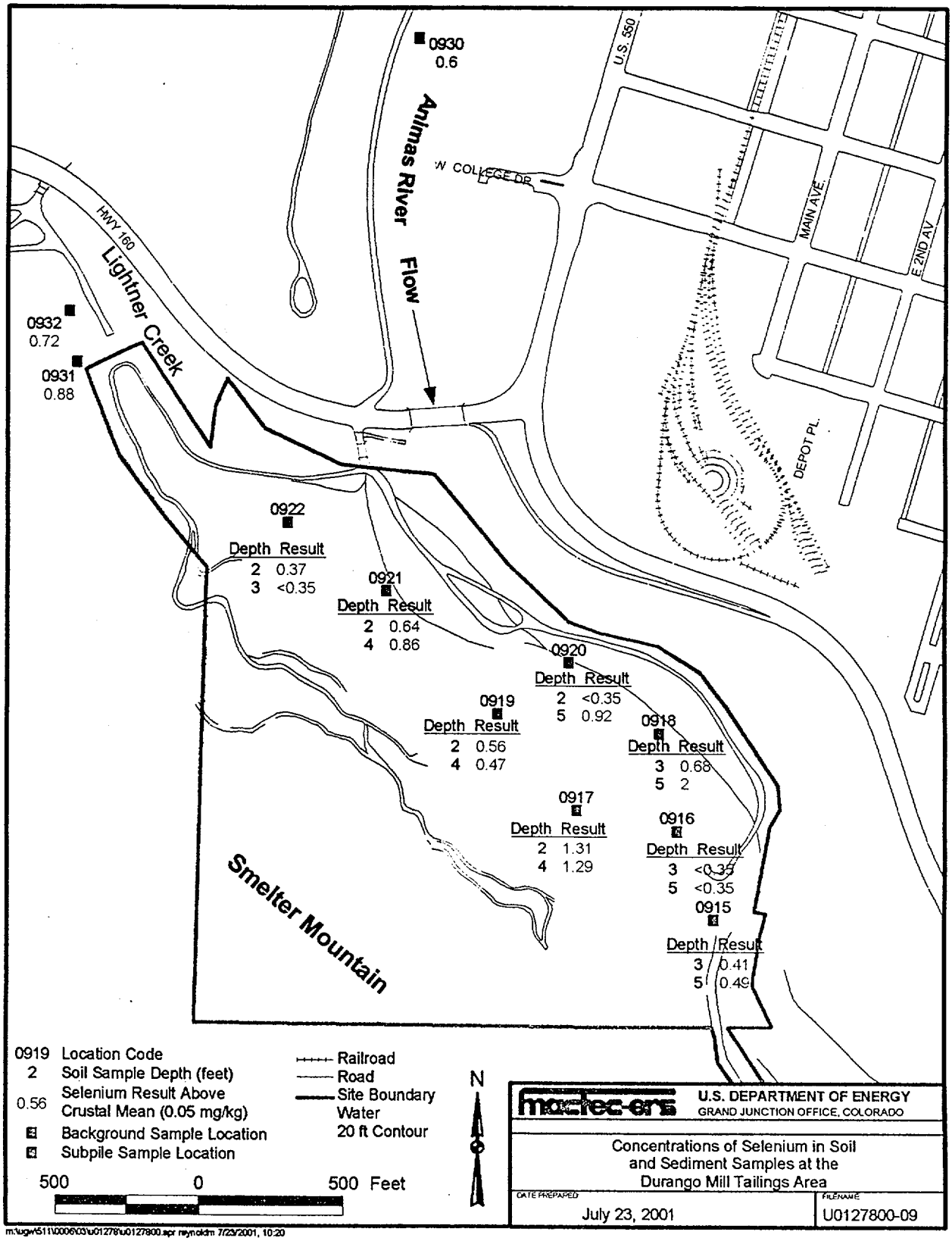

Figure 7. Concentrations of Selenium in Soil and Sediment Samples at the Durango Mill Tailings Area

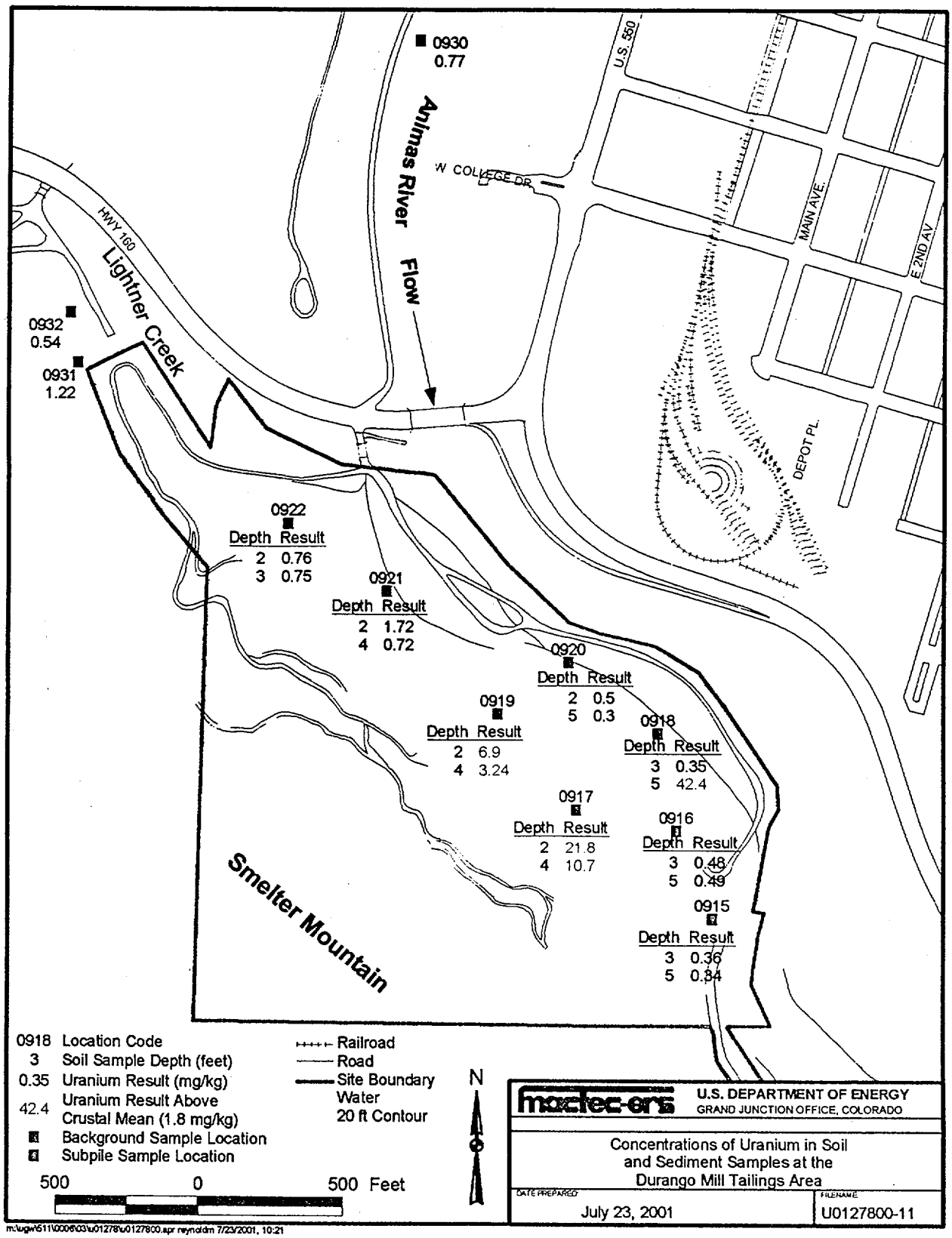

Figure 8. Concentrations of Uranium in Soil and Sediment Samples at the Durango Mill Tailings Area

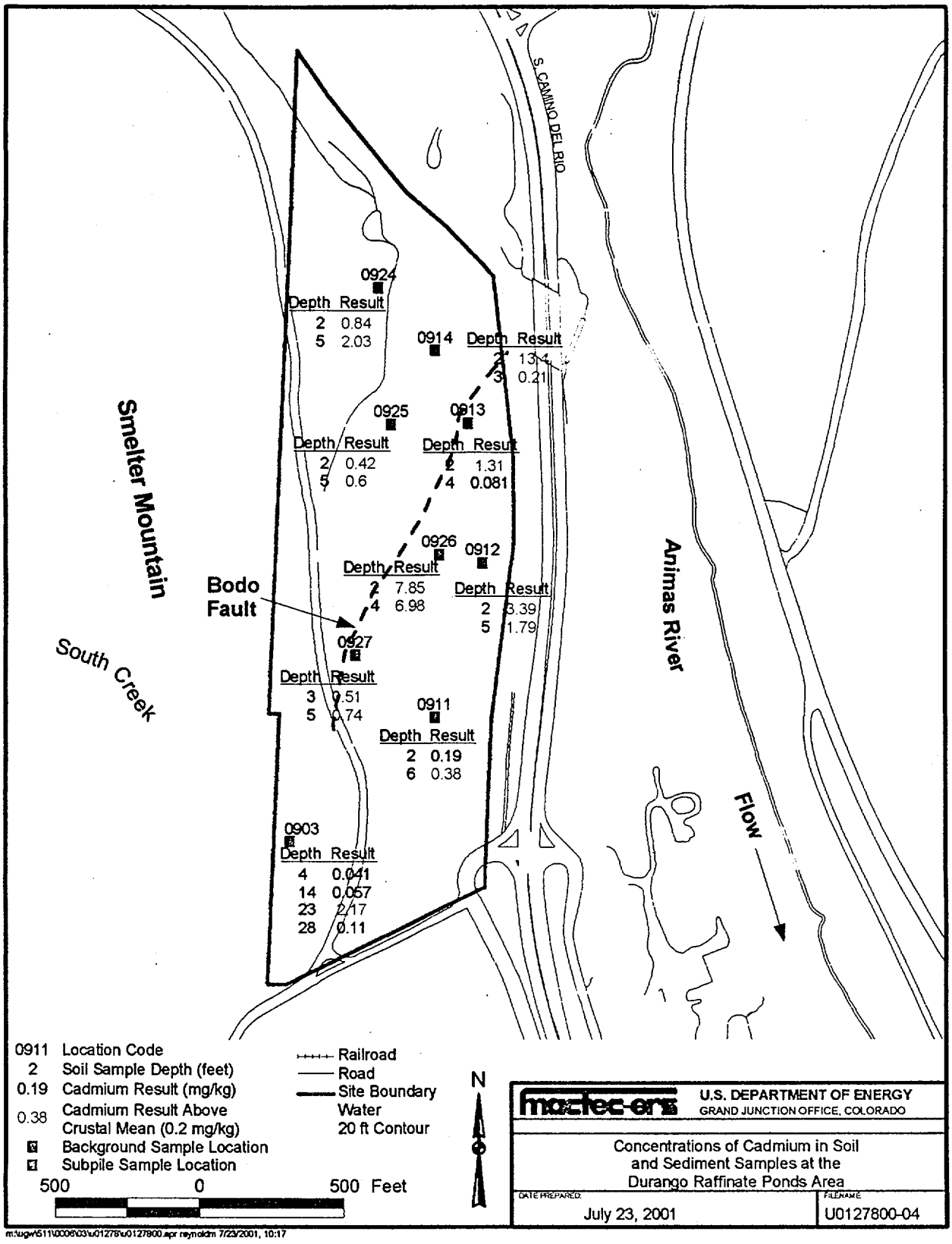

Figure 9. Concentrations of Cadmium in Soil and Sediment Samples at the Durango Raffinate Ponds Area

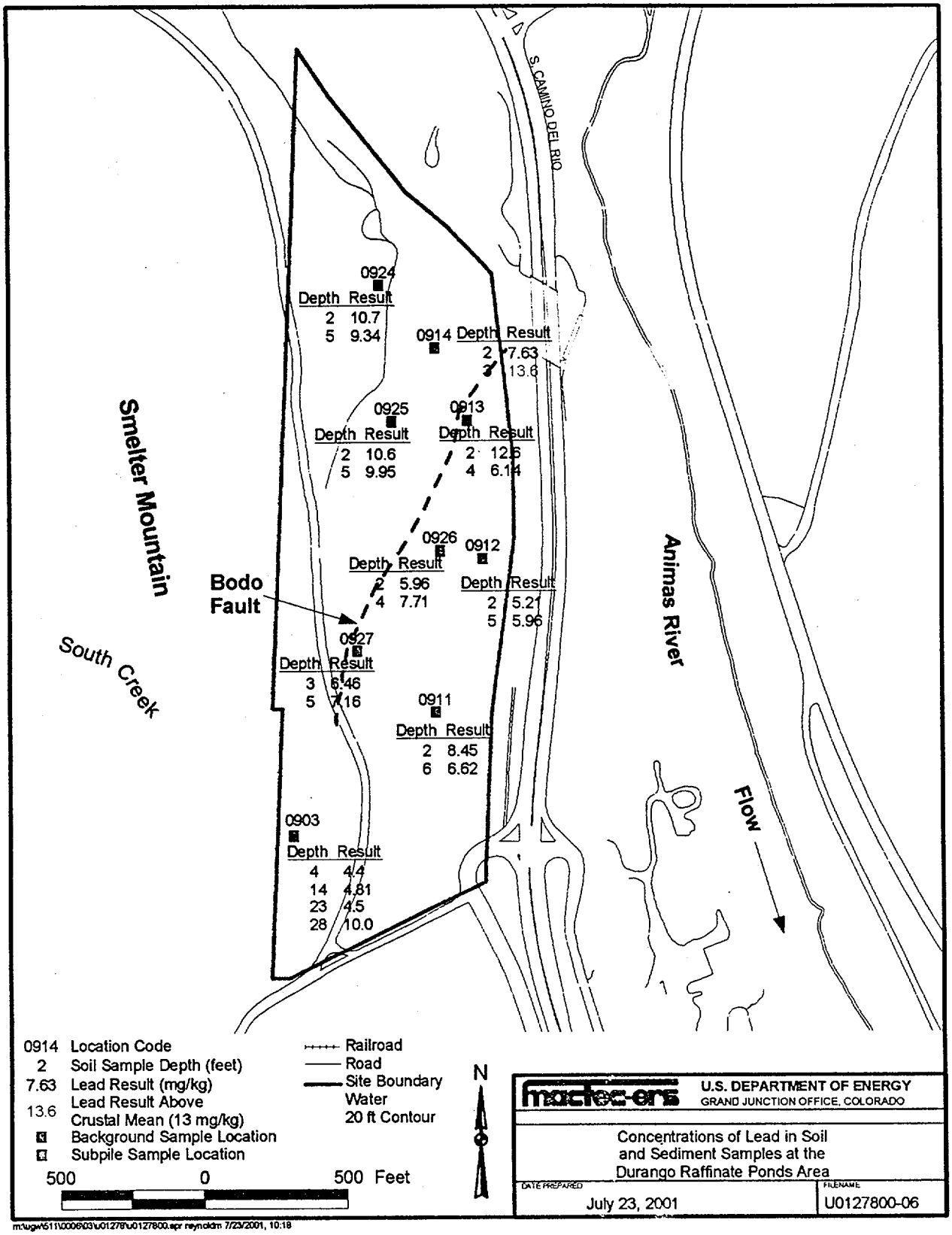

Figure 10. Concentrations of Lead in Soil and Sediment Samples at the Durango Raffinate Ponds Area

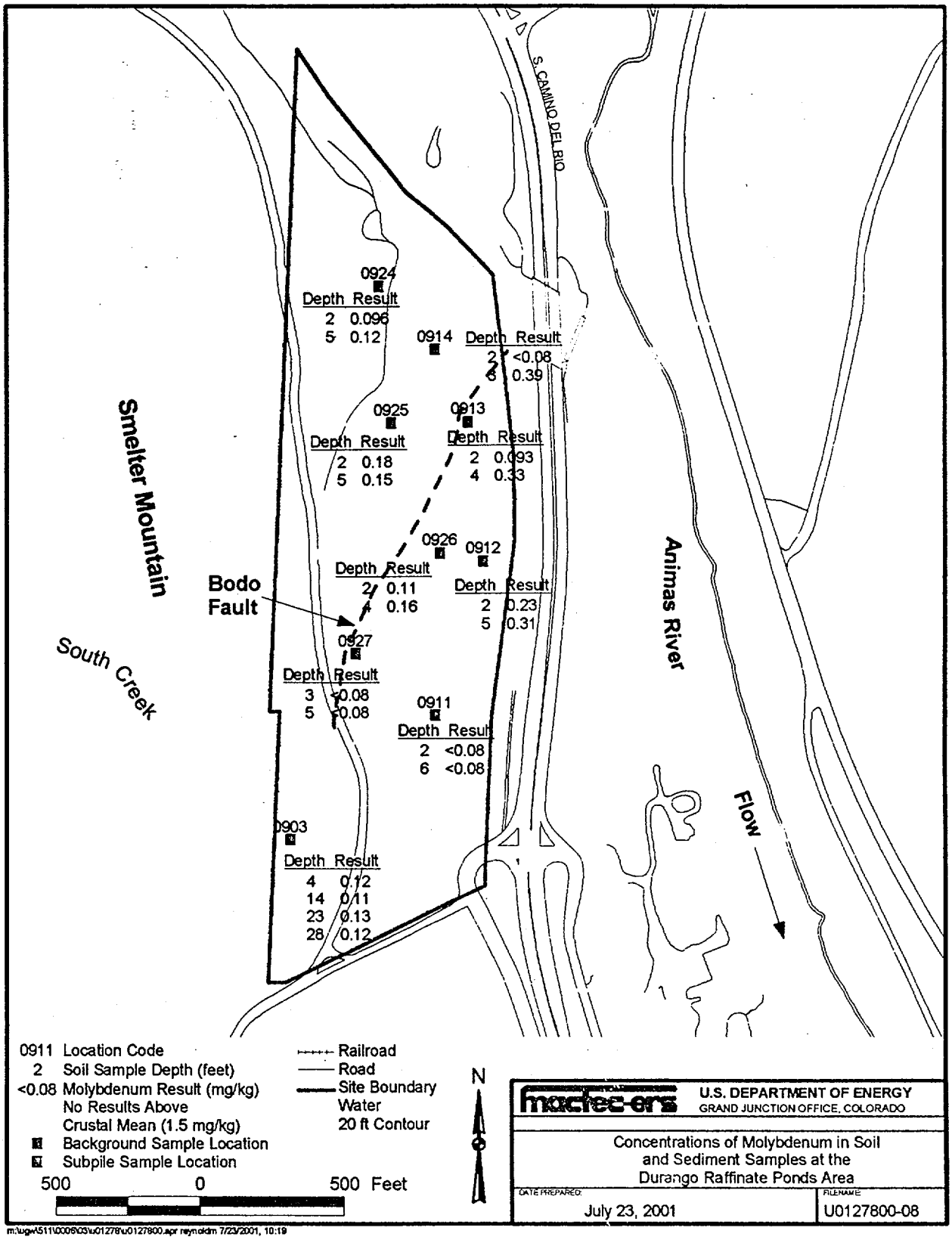

Figure 11. Concentrations of Molybdenum in Soil and Sediment Samples at the Durango Raffinate Ponds Area

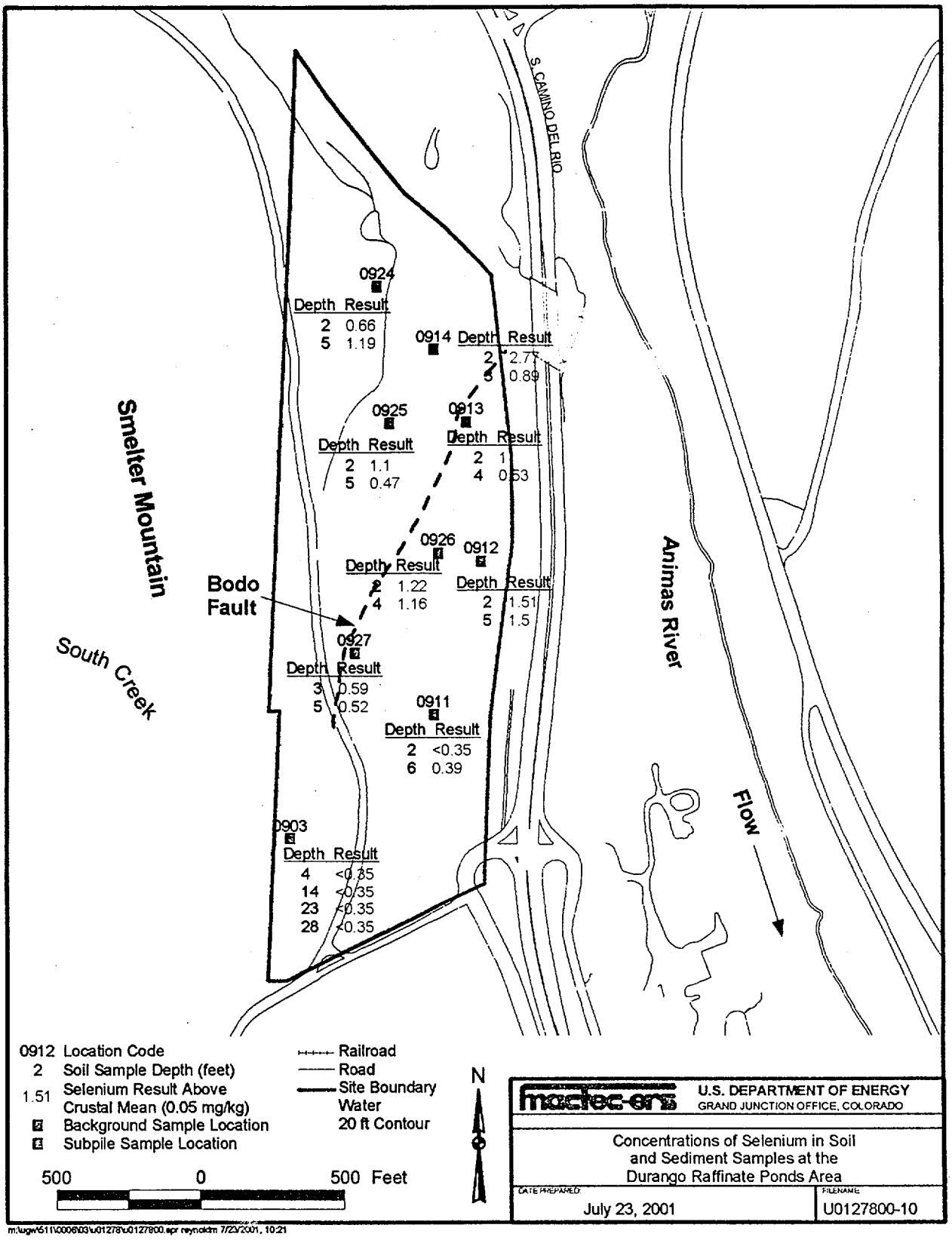

Figure 12. Concentrations of Selenium in Soil and Sediment Samples at the Durango Raffinate Ponds Area

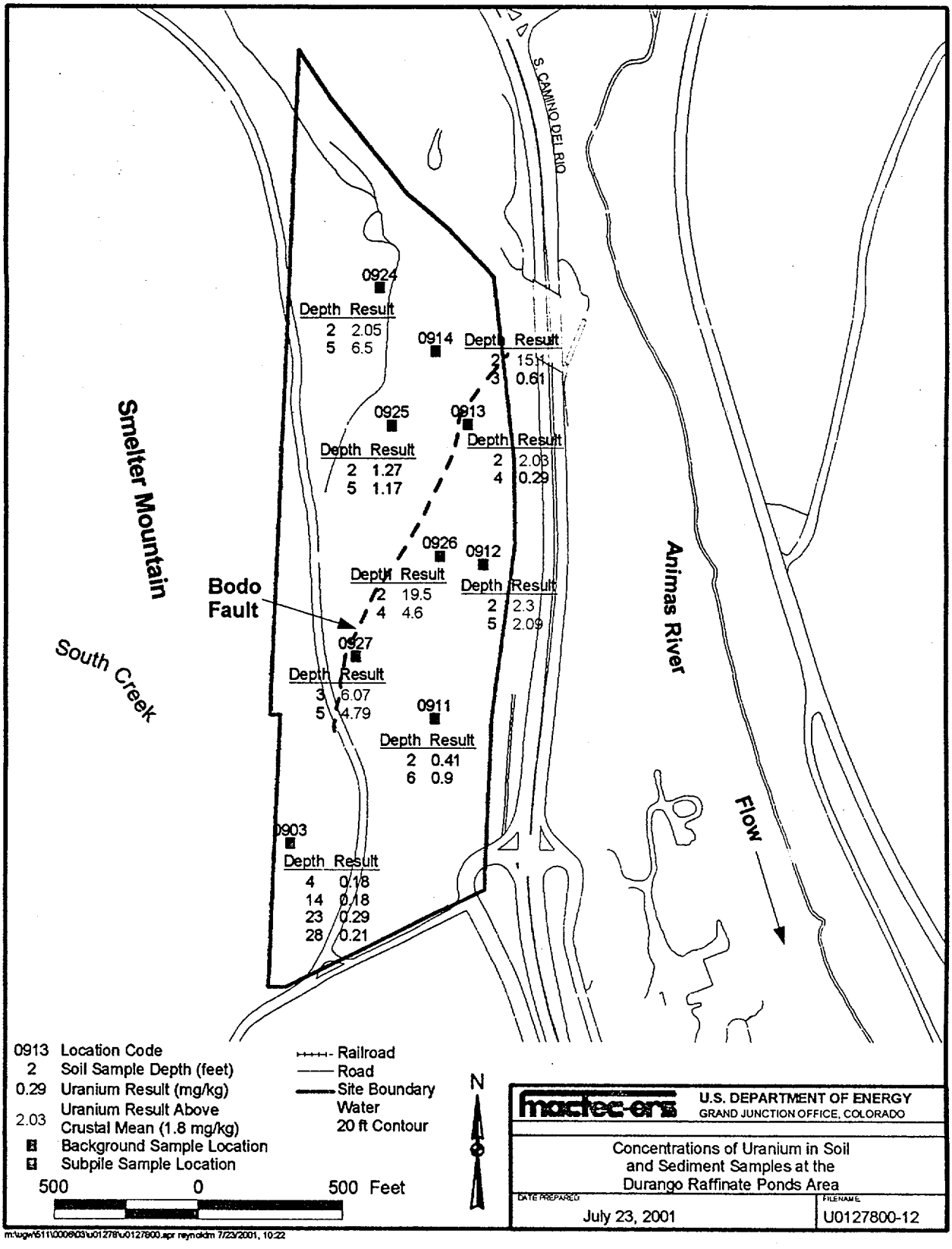

Figure 13. Concentrations of Uranium in Soil and Sediment Samples at the Durango Raffinate Ponds Area

Appendix A

Environmental Sciences Laboratory Work Submittal

WORK SUBMITTAL TO ENVIRONMENTAL SCIENCES LABORATORY

Submittal Date 12/18/00 Date Required _____

Submitted By Dezbah TSU Signature Dezbah C. DD for Dave Miller

Formal Report Required (check one)? Yes X No ___

Project: Durango - Field Invest. Charge No. 351415002

Analysis Type (check one): Kd ___ Leaching X Other ___

Sample Numbers See attached

NDL 556 to NDL600

Analytes U, Mo, Se, Cd, Pb

Solution Composition 5% HNO_3

Comments (attach procedure if needed) 4 Blanks (MilliQ H_2O)] no solids

2 Process blanks (5% HNO_3)]

delete sequential leaching 12/00 Leach only with 5% HNO_3

Tracking (ESL use only):

Actual Labor Hours (ESL use only):

Appendix B

Environmental Sciences Laboratory Notes and Field Notes

AMPAD EFFICIENCY LINE™ 22-210

Durango Subpile samples DURO2-01-01

11/22/00 Subpile soil sample received from David Miller at ESL.
Of the 39 subpile samples received, 2 are consolidated/coherent bedrock samples

All samples set out to air dry. When dry they will be separated into >2mm and <2mm size fractions by passing samples through a 10 mesh (2mm) sieve. The <2mm fraction will be used for ~~data~~ or analytical processing.

Sample DURO1-930-A2 (alluvium) was collected for both Kd and subpile analyses.

1/18/01 Subpile samples ~~processed~~ or processing completed. Processing followed the ESL procedure CB(BT-1) "Standard Batch Leaching"

1. Weighed 1g ± 5mg ~~factor~~ of solid into a 50mL centrifuge tube. Weighed a second 1g ± 5mg into a second 50mL c-tube.
2. added 50mL 5% HNO_3 to each tube
3. agitated end-over-end for 4 hours
4. removed tubes from shaker & centrifuged ~30min @ 3000rpm
5. poured off supernatant from both tubes into 200mL volumetric flask
6. ~~added 100mL 5%~~ or 50mL 5% HNO_3 to the residue in each tube
7. shake for ~30 min
8. centrifuged for ~30 min @ ~3000rpm
9. poured off supernatant into 200mL volumetric flask
10. added 5% HNO_3 to volumetric flask (if necessary) to fill to volume
11. filtered ~~solution~~ 200mL solution through 0.45μm filter ~~or~~
12. submitted to analytical laboratory for analyses of Cd, Mo, Pb, Se, U

DURO2-01-02

AMPAD EFFICIENCY LINE® 22-210

DUR02-01-02

Durango subpile samples, cont

1/18/01, cont

During processing, the following samples reacted to the addition of 5% HNO_3. They bubbled indicating the presence of $CaCO_3$ in the solid samples

(raffinate pond = Ø2)	DURØ2	912-5	] bubbled for over 5 minutes
	DURØ2	912-2	
	DURØ2	913-2	
	DURØ2	914-2	
(millsite = Ø1)	DURØ1	917-2	
	DURØ1	921-2	
	DURØ1	921-4	
	DURØ2	924-2	] bubbled for over 5 minutes
	DURØ2	924-5	
	DURØ2	926-2	
	DURØ2	926-4	bubbled longer than 926-2
	DURØ1	931-Colluv	
	DURØ1	932-colluv	

Before they could be processed samples DURØ2-913-3.5 & DURØ2-914-3 were sent to sample prep for crushing. They were coherent/cohesive bedrock samples on 01/9/01. They were processed & submitted with the remaining subpile samples. Submittal date: 01/18/01.

DUR02-01-03

Durango subpile samples

Loc.	depth (ft)	comment	sample lithology (fr. C. Goodknight)	description
DUR01 = Durango Millsite				
915	3		silt	soil material brought in w/ hard angular PLS Fm frag
915	5		rock frag & slag	colluvial material
916	3		silt	soil material brought in
916	5		silt & rock frag.	colluvial material
917	2		silt	soil material brought in
917	4-5		silt & rock frag.	colluvial material- PLS Fm rock frag
918	3		silt	soil material brought in
918	5		silt, rock frag & slag	colluvial material, rock frag & slag
919	2		silt & rock frag.	colluvial material
919	4		rock frag	colluvial material, rock frag derived from PLS Fm
920	2		silt	soil material brought in for final grade
920	5		silt & rock frag	colluvial material
921	2		silt	soil material brought in for final grade
921	4		silt & rock frag	colluvial material
922	2		silt	soil material brought in for final grade
922	3-4		silt & rock frag	colluvial material
930	AL		alluvium	
931	COL	background	colluvium	mixture of siltstone & shale fro PLS Fm & Mancos Shale
932	COL	background	colluvium	mixture of siltstone & shale fro PLS Fm & Mancos Shale
DUR02 = Durango Raffinate Ponds				
903	14-16	background	colluvium	silty sand, clasts of ss & black carbonaceous shale
903	23-26	background	colluvium	silty sand, clasts of ss & black carbonaceous shale
903	28-29	background	terrace alluvium	gravel & med sand
903	4-6	background	terrace alluvium	gravel & med sand
911	2		silt fill	soil material brought in for final grade
911	6		gravelly sand	fill and colluvial material
912	2		silt fill	soil material brought in for final grade
912	5		silty gravel	fill and colluvial material
913	2		silt fill	soil material brought in for final grade
913	3.5	bedrock	sandstone core	Menefee Fm: sndstn unweathered med light gray
914	2		silt fill	soil material brought in for final grade
914	3	bedrock	shale	weathered shale and siltstone from PLS Fm
924	2		silt fill	soil material brought in for final grade
924	5-6		weathered shale	weathered shale and siltstone from PLS Fm
925	2		silt fill	soil material brought in for final grade
925	5		weathered shale	weathered shale and siltstone from PLS Fm
926	2		silt fill	soil material brought in for final grade
926	4		silty gravel	fill and colluvial material
927	3		silty sand	soil material as fill for final grade
927	5-6		sandy gravel	fill

Notes:
Sample name is combination of area, location, and depth. For example, DUR02-903-14 is the sample collected from the Raffinate Ponds area, at location 903, beginning at at depth of 14 ft. This is abbreviated to 903-14 ft when discussing only the Raffinate Ponds area.

background = background sample
bedrock = sample collected was consolidated rock, was mechanically crushed in order to perform analyses

Durango Raffinate Ponds Area: November 2000 Soil Sample Results
Requisition number: 17272

Lab Number	ID	Ticket Number	Date Received	Analyte Name	Analyte Alias	Result (mg/kg)	UNITS	Lab Qualifiers	Date Analyzed	Analysis Method	Sample start-end Depth (ft)	Sampling Method	Lithology	Sample Comments	ESL Preparation Method	Result Comments
272672	DUR02-903-4	NDL556	11/22/00	Cadmium	7440-43-9	0.041	MG/KG	B	1/24/01	AS-6 R06	4-6	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272672	DUR02-903-4	NDL556	11/22/00	Lead	7439-92-1	4.4	MG/KG		1/24/01	AS-6 R06	4-6	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272672	DUR02-903-4	NDL556	11/22/00	Molybdenu	7439-98-7	0.12	MG/KG	B	1/24/01	AS-6 R06	4-6	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272672	DUR02-903-4	NDL556	11/22/00	Selenium	7782-49-2	0.35	MG/KG	U	2/2/01	AS-5 R06	4-6	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272672	DUR02-903-4	NDL556	11/22/00	Uranium	7440-61-1	0.18	MG/KG		1/24/01	AS-6 R06	4-6	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272673	DUR02-903-14	NDL557	11/22/00	Cadmium	7440-43-9	0.057	MG/KG	B	1/24/01	AS-6 R06	14-16	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272673	DUR02-903-14	NDL557	11/22/00	Lead	7439-92-1	4.81	MG/KG		1/24/01	AS-6 R06	14-16	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272673	DUR02-903-14	NDL557	11/22/00	Molybdenu	7439-98-7	0.11	MG/KG	B	1/24/01	AS-6 R06	14-16	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272673	DUR02-903-14	NDL557	11/22/00	Selenium	7782-49-2	0.35	MG/KG	U	2/2/01	AS-5 R06	14-16	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272673	DUR02-903-14	NDL557	11/22/00	Uranium	7440-61-1	0.18	MG/KG		1/24/01	AS-6 R06	14-16	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272674	DUR02-903-23	NDL558	11/22/00	Cadmium	7440-43-9	2.17	MG/KG		1/24/01	AS-6 R06	23-26	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272674	DUR02-903-23	NDL558	11/22/00	Lead	7439-92-1	4.5	MG/KG		1/24/01	AS-6 R06	23-26	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272674	DUR02-903-23	NDL558	11/22/00	Molybdenu	7439-98-7	0.13	MG/KG	B	1/24/01	AS-6 R06	23-26	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272674	DUR02-903-23	NDL558	11/22/00	Selenium	7782-49-2	0.35	MG/KG	U	2/2/01	AS-5 R06	23-26	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272674	DUR02-903-23	NDL558	11/22/00	Uranium	7440-61-1	0.29	MG/KG		1/24/01	AS-6 R06	23-26	GB	Colluvium	Background	CB (BT-1)	5% HNO3
272675	DUR02-903-28	NDL559	11/22/00	Cadmium	7440-43-9	0.11	MG/KG		1/24/01	AS-6 R06	28-29	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272675	DUR02-903-28	NDL559	11/22/00	Lead	7439-92-1	10	MG/KG		1/24/01	AS-6 R06	28-29	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272675	DUR02-903-28	NDL559	11/22/00	Molybdenu	7439-98-7	0.12	MG/KG	B	1/24/01	AS-6 R06	28-29	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272675	DUR02-903-28	NDL559	11/22/00	Selenium	7782-49-2	0.35	MG/KG	U	2/2/01	AS-5 R06	28-29	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272675	DUR02-903-28	NDL559	11/22/00	Uranium	7440-61-1	0.21	MG/KG		1/24/01	AS-6 R06	28-29	GB	Terrace Alluvium	Background	CB (BT-1)	5% HNO3
272676	DUR02-911-2	NDL560	11/22/00	Cadmium	7440-43-9	0.19	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272676	DUR02-911-2	NDL560	11/22/00	Lead	7439-92-1	8.45	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272676	DUR02-911-2	NDL560	11/22/00	Molybdenu	7439-98-7	0.08	MG/KG	U	1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272676	DUR02-911-2	NDL560	11/22/00	Selenium	7782-49-2	0.35	MG/KG	U	2/2/01	AS-5 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272676	DUR02-911-2	NDL560	11/22/00	Uranium	7440-61-1	0.41	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272677	DUR02-911-6	NDL561	11/22/00	Cadmium	7440-43-9	0.38	MG/KG		1/24/01	AS-6 R06	6-6	GB	Gravelly sand fill		CB (BT-1)	5% HNO3
272677	DUR02-911-6	NDL561	11/22/00	Lead	7439-92-1	6.62	MG/KG		1/24/01	AS-6 R06	6-6	GB	Gravelly sand fill		CB (BT-1)	5% HNO3
272677	DUR02-911-6	NDL561	11/22/00	Molybdenu	7439-98-7	0.08	MG/KG	U	1/24/01	AS-6 R06	6-6	GB	Gravelly sand fill		CB (BT-1)	5% HNO3
272677	DUR02-911-6	NDL561	11/22/00	Selenium	7782-49-2	0.39	MG/KG	B	2/2/01	AS-5 R06	6-6	GB	Gravelly sand fill		CB (BT-1)	5% HNO3
272677	DUR02-911-6	NDL561	11/22/00	Uranium	7440-61-1	0.9	MG/KG		1/24/01	AS-6 R06	6-6	GB	Gravelly sand fill		CB (BT-1)	5% HNO3
272678	DUR02-912-2	NDL562	11/22/00	Cadmium	7440-43-9	3.39	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272678	DUR02-912-2	NDL562	11/22/00	Lead	7439-92-1	5.21	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272678	DUR02-912-2	NDL562	11/22/00	Molybdenu	7439-98-7	0.23	MG/KG	B	1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272678	DUR02-912-2	NDL562	11/22/00	Selenium	7782-49-2	1.51	MG/KG		2/2/01	AS-5 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272678	DUR02-912-2	NDL562	11/22/00	Uranium	7440-61-1	2.3	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272679	DUR02-912-5	NDL563	11/22/00	Cadmium	7440-43-9	1.79	MG/KG		1/24/01	AS-6 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272679	DUR02-912-5	NDL563	11/22/00	Lead	7439-92-1	5.96	MG/KG		1/24/01	AS-6 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272679	DUR02-912-5	NDL563	11/22/00	Molybdenu	7439-98-7	0.31	MG/KG	B	1/24/01	AS-6 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272679	DUR02-912-5	NDL563	11/22/00	Selenium	7782-49-2	1.5	MG/KG		2/2/01	AS-5 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272679	DUR02-912-5	NDL563	11/22/00	Uranium	7440-61-1	2.09	MG/KG		1/24/01	AS-6 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272680	DUR02-913-2	NDL564	11/22/00	Cadmium	7440-43-9	1.31	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3

Durango Raffinate Ponds Area: November 2000 Soil Sample Results
Requisition number: 17272

Lab Number	ID	Ticket Number	Date Received	Analyte Name	Analyte Alias	Result (mg/kg)	UNITS	Lab Qualifiers	Date Analyzed	Analysis Method	Sample start-end Depth (ft)	Sampling Method	Lithology	Sample Comments	ESL Preparation Method	Result Comments
272680	DUR02-913-2	NDL564	11/22/00	Lead	7439-92-1	12.6	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272680	DUR02-913-2	NDL564	11/22/00	Molybdenu	7439-98-7	0.093	MG/KG	B	1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272680	DUR02-913-2	NDL564	11/22/00	Selenium	7782-49-2	1.00	MG/KG		2/2/01	AS-5 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272680	DUR02-913-2	NDL564	11/22/00	Uranium	7440-61-1	2.03	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272681	DUR02-913-3.5	NDL565	11/22/00	Cadmium	7440-43-9	0.081	MG/KG	B	1/24/01	AS-6 R06	4-4	GB	Menefee Formation	Unweathered sandstone	CB (BT-1)	5% HNO3
272681	DUR02-913-3.5	NDL565	11/22/00	Lead	7439-92-1	6.14	MG/KG		1/24/01	AS-6 R06	4-4	GB	Menefee Formation	Unweathered sandstone	CB (BT-1)	5% HNO3
272681	DUR02-913-3.5	NDL565	11/22/00	Molybdenu	7439-98-7	0.33	MG/KG	B	1/24/01	AS-6 R06	4-4	GB	Menefee Formation	Unweathered sandstone	CB (BT-1)	5% HNO3
272681	DUR02-913-3.5	NDL565	11/22/00	Selenium	7782-49-2	0.53	MG/KG		2/2/01	AS-5 R06	4-4	GB	Menefee Formation	Unweathered sandstone	CB (BT-1)	5% HNO3
272681	DUR02-913-3.5	NDL565	11/22/00	Uranium	7440-61-1	0.29	MG/KG		1/24/01	AS-6 R06	4-4	GB	Menefee Formation	Unweathered sandstone	CB (BT-1)	5% HNO3
272682	DUR02-914-2	NDL566	11/22/00	Cadmium	7440-43-9	13.4	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272682	DUR02-914-2	NDL566	11/22/00	Lead	7439-92-1	7.63	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272682	DUR02-914-2	NDL566	11/22/00	Molybdenu	7439-98-7	0.08	MG/KG	U	1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272682	DUR02-914-2	NDL566	11/22/00	Selenium	7782-49-2	2.77	MG/KG		2/2/01	AS-5 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272682	DUR02-914-2	NDL566	11/22/00	Uranium	7440-61-1	15.1	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272683	DUR02-914-3	NDL567	11/22/00	Cadmium	7440-43-9	0.21	MG/KG		1/24/01	AS-6 R06	3-3	GB	Point Lookout Sandstone Formation	Weathered shale	CB (BT-1)	5% HNO3
272683	DUR02-914-3	NDL567	11/22/00	Lead	7439-92-1	13.6	MG/KG		1/24/01	AS-6 R06	3-3	GB	Point Lookout Sandstone Formation	Weathered shale	CB (BT-1)	5% HNO3
272683	DUR02-914-3	NDL567	11/22/00	Molybdenu	7439-98-7	0.39	MG/KG	B	1/24/01	AS-6 R06	3-3	GB	Point Lookout Sandstone Formation	Weathered shale	CB (BT-1)	5% HNO3
272683	DUR02-914-3	NDL567	11/22/00	Selenium	7782-49-2	0.89	MG/KG		2/2/01	AS-5 R06	3-3	GB	Point Lookout Sandstone Formation	Weathered shale	CB (BT-1)	5% HNO3
272683	DUR02-914-3	NDL567	11/22/00	Uranium	7440-61-1	0.61	MG/KG		1/24/01	AS-6 R06	3-3	GB	Point Lookout Sandstone Formation	Weathered shale	CB (BT-1)	5% HNO3
272700	DUR02-924-2	NDL584	11/22/00	Cadmium	7440-43-9	0.84	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272700	DUR02-924-2	NDL584	11/22/00	Lead	7439-92-1	10.7	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272700	DUR02-924-2	NDL584	11/22/00	Molybdenu	7439-98-7	0.096	MG/KG	B	1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272700	DUR02-924-2	NDL584	11/22/00	Selenium	7782-49-2	0.66	MG/KG		2/2/01	AS-5 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272700	DUR02-924-2	NDL584	11/22/00	Uranium	7440-61-1	2.05	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272701	DUR02-924-5	NDL585	11/22/00	Cadmium	7440-43-9	2.03	MG/KG		1/24/01	AS-6 R06	5-6	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272701	DUR02-924-5	NDL585	11/22/00	Lead	7439-92-1	9.34	MG/KG		1/24/01	AS-6 R06	5-6	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272701	DUR02-924-5	NDL585	11/22/00	Molybdenu	7439-98-7	0.12	MG/KG	B	1/24/01	AS-6 R06	5-6	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272701	DUR02-924-5	NDL585	11/22/00	Selenium	7782-49-2	1.19	MG/KG		2/2/01	AS-5 R06	5-6	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272701	DUR02-924-5	NDL585	11/22/00	Uranium	7440-61-1	6.5	MG/KG		1/24/01	AS-6 R06	5-6	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272702	DUR02-925-2	NDL586	11/22/00	Cadmium	7440-43-9	0.42	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272702	DUR02-925-2	NDL586	11/22/00	Lead	7439-92-1	10.6	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272702	DUR02-925-2	NDL586	11/22/00	Molybdenu	7439-98-7	0.18	MG/KG	B	1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272702	DUR02-925-2	NDL586	11/22/00	Selenium	7782-49-2	1.1	MG/KG		2/2/01	AS-5 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272702	DUR02-925-2	NDL586	11/22/00	Uranium	7440-61-1	1.27	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272703	DUR02-925-5	NDL587	11/22/00	Cadmium	7440-43-9	0.60	MG/KG		1/24/01	AS-6 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272703	DUR02-925-5	NDL587	11/22/00	Lead	7439-92-1	9.95	MG/KG		1/24/01	AS-6 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272703	DUR02-925-5	NDL587	11/22/00	Molybdenu	7439-98-7	0.15	MG/KG	B	1/24/01	AS-6 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272703	DUR02-925-5	NDL587	11/22/00	Selenium	7782-49-2	0.47	MG/KG	B	2/2/01	AS-5 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272703	DUR02-925-5	NDL587	11/22/00	Uranium	7440-61-1	1.17	MG/KG		1/24/01	AS-6 R06	5-5	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272704	DUR02-926-2	NDL588	11/22/00	Cadmium	7440-43-9	7.85	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272704	DUR02-926-2	NDL588	11/22/00	Lead	7439-92-1	5.96	MG/KG		1/24/01	AS-6 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3

Durango Raffinate Ponds Area: November 2000 Soil Sample Results
Requisition number: 17272

Lab Number	ID	Ticket Number	Date Received	Analyte Name	Analyte Alias	Result (mg/kg)	UNITS	Lab Qualifiers	Date Analyzed	Analysis Method	Sample start-end Depth (ft)	Sampling Method	Lithology	Sample Comments	ESL Preparation Method	Result Comments
272704	DUR02-926-2	NDL588	11/22/00	Molybdenu	7439-98-7	0.11	MG/KG	B	1/24/01	AS-3 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272704	DUR02-926-2	NDL588	11/22/00	Selenium	7782-49-2	1.22	MG/KG		2/2/01	AS-5 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272704	DUR02-926-2	NDL588	11/22/00	Uranium	7440-61-1	19.5	MG/KG		1/24/01	AS-3 R06	2-2	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272705	DUR02-926-4	NDL589	11/22/00	Cadmium	7440-43-9	6.98	MG/KG		1/24/01	AS-3 R06	4-4	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272705	DUR02-926-4	NDL589	11/22/00	Lead	7439-92-1	7.71	MG/KG		1/24/01	AS-3 R06	4-4	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272705	DUR02-926-4	NDL589	11/22/00	Molybdenu	7439-98-7	0.16	MG/KG	B	1/24/01	AS-3 R06	4-4	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272705	DUR02-926-4	NDL589	11/22/00	Selenium	7782-49-2	1.16	MG/KG		2/2/01	AS-5 R06	4-4	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272705	DUR02-926-4	NDL589	11/22/00	Uranium	7440-61-1	4.6	MG/KG		1/24/01	AS-3 R06	4-4	GB	Silty gravel fill		CB (BT-1)	5% HNO3
272706	DUR02-927-3	NDL590	11/22/00	Cadmium	7440-43-9	0.51	MG/KG		1/24/01	AS-3 R06	3-3	GB	Silty sand & gravel		CB (BT-1)	5% HNO3
272706	DUR02-927-3	NDL590	11/22/00	Lead	7439-92-1	6.46	MG/KG		1/24/01	AS-3 R06	3-3	GB	Silty sand & gravel		CB (BT-1)	5% HNO3
272706	DUR02-927-3	NDL590	11/22/00	Molybdenu	7439-98-7	0.08	MG/KG	U	1/24/01	AS-3 R06	3-3	GB	Silty sand & gravel		CB (BT-1)	5% HNO3
272706	DUR02-927-3	NDL590	11/22/00	Selenium	7782-49-2	0.59	MG/KG		2/2/01	AS-5 R06	3-3	GB	Silty sand & gravel		CB (BT-1)	5% HNO3
272706	DUR02-927-3	NDL590	11/22/00	Uranium	7440-61-1	6.07	MG/KG		1/24/01	AS-3 R06	3-3	GB	Silty sand & gravel		CB (BT-1)	5% HNO3
272707	DUR02-927-5	NDL591	11/22/00	Cadmium	7440-43-9	0.74	MG/KG		1/24/01	AS-3 R06	5-6	GB	Sandy gravel		CB (BT-1)	5% HNO3
272707	DUR02-927-5	NDL591	11/22/00	Lead	7439-92-1	7.16	MG/KG		1/24/01	AS-3 R06	5-6	GB	Sandy gravel		CB (BT-1)	5% HNO3
272707	DUR02-927-5	NDL591	11/22/00	Molybdenu	7439-98-7	0.08	MG/KG	U	1/24/01	AS-3 R06	5-6	GB	Sandy gravel		CB (BT-1)	5% HNO3
272707	DUR02-927-5	NDL591	11/22/00	Selenium	7782-49-2	0.52	MG/KG		2/2/01	AS-5 R06	5-6	GB	Sandy gravel		CB (BT-1)	5% HNO3
272707	DUR02-927-5	NDL591	11/22/00	Uranium	7440-61-1	4.79	MG/KG		1/24/01	AS-3 R06	5-6	GB	Sandy gravel		CB (BT-1)	5% HNO3
272712	DUR02-P2	NDL596	1/17/01	Cadmium	7440-43-9	0.03	MG/KG	U	1/24/01	AS-3 R06				Process blank 5% HNO3	CB (BT-1)	5% HNO3
272712	DUR02-P2	NDL596	1/17/01	Lead	7439-92-1	0.01	MG/KG	U	1/29/00	AS-5 R06				Process blank 5% HNO3	CB (BT-1)	5% HNO3
272712	DUR02-P2	NDL596	1/17/01	Molybdenu	7439-98-7	0.08	MG/KG	U	1/24/01	AS-3 R06				Process blank 5% HNO3	CB (BT-1)	5% HNO3
272712	DUR02-P2	NDL596	1/17/01	Selenium	7782-49-2	0.35	MG/KG	U	2/2/01	AS-5 R06				Process blank 5% HNO3	CB (BT-1)	5% HNO3
272712	DUR02-P2	NDL596	1/17/01	Uranium	7440-61-1	0.01	MG/KG		1/24/01	AS-3 R06				Process blank 5% HNO3	CB (BT-1)	5% HNO3
272715	DUR02-B3	NDL599	1/17/01	Cadmium	7440-43-9	0.03	MG/KG	U	1/24/01	AS-3 R06				Blank: 18MΩ deionized water		WATER
272715	DUR02-B3	NDL599	1/17/01	Lead	7439-92-1	0.014	MG/KG	B	1/29/00	AS-6 R06				Blank: 18MΩ deionized water		WATER
272715	DUR02-B3	NDL599	1/17/01	Molybdenu	7439-98-7	0.08	MG/KG	U	1/24/01	AS-3 R06				Blank: 18MΩ deionized water		WATER
272715	DUR02-B3	NDL599	1/17/01	Selenium	7782-49-2	0.35	MG/KG	U	2/2/01	AS-5 R06				Blank: 18MΩ deionized water		WATER
272715	DUR02-B3	NDL599	1/17/01	Uranium	7440-61-1	0.01	MG/KG		1/24/01	AS-3 R06				Blank: 18MΩ deionized water		WATER
272716	DUR02-B4	NDL600	1/17/01	Cadmium	7440-43-9	0.03	MG/KG	U	1/24/01	AS-3 R06				Blank: 18MΩ deionized water		WATER
272716	DUR02-B4	NDL600	1/17/01	Lead	7439-92-1	0.02	MG/KG	B	1/29/00	AS-6 R06				Blank: 18MΩ deionized water		WATER
272716	DUR02-B4	NDL600	1/17/01	Molybdenu	7439-98-7	0.08	MG/KG	U	1/24/01	AS-3 R06				Blank: 18MΩ deionized water		WATER
272716	DUR02-B4	NDL600	1/17/01	Selenium	7782-49-2	0.35	MG/KG	U	2/2/01	AS-5 R06				Blank: 18MΩ deionized water		WATER
272716	DUR02-B4	NDL600	1/17/01	Uranium	7440-61-1	0.01	MG/KG		1/24/01	AS-3 R06				Blank: 18MΩ deionized water		WATER

Site Observational Work Plan
for the UMTRA Project Site at
Durango, Colorado
Appendices B, D, E, and I

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED: PLATE 1: "DURANGO BASE MAP" WITHIN THIS PACKAGE

NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-1

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED: "GEOLOGIC MAP OF THE RAFFINATE PONDS AREA DURANGO, CO" WITHIN THIS PACKAGE

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D-2

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

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PLATE: 3
"NORTH-SOUTH CROSS SECTION OF BEDROCK FORMATIONS AND COAL BEDS AT THE RAFFINATE PONDS PONDS AREA"
WITHIN THIS PACKAGE

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